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THE SEA-MAN'S Kalender:

OR,

An *Ephemerides* of the *Sun, Moon*, and certain of the moſt notable *Fixed Stars*.

AS ALSO,

A Table of the *Longitude* and *Latitude* of all the moſt Eminent places of the World, firſt Calculated by JOHN TAP.

Since Corrected, and enlarged with many Additions.

VIZ.

New exact TABLES of the *North-Star*; New Tables of 65 of the principal *Fixed Stars*; their time of coming upon the *Meridian* every day; with their *Right Aſcenſion* and *Declination*, &c.

WITH

A Diſcovery of a way to find the long hidden Secret of *LONGITUDE*, by *Henry Bond*, Teacher of the *Mathematicks* in the *Bulwark* near the *Tower*.

All which are now newly Calculated and Corrected, and many Rules and Tables added.

By HENRY PHILIPPES, *Philo-Nauticus*.

1674
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To the Courteous Readers, Health.

Gentle and indifferent Readers, you who are ready to applaud that which is good, and paſs over with ſilence that which is not hurtful, without ſcoffing the work, or deriding the Author: and who having ſome skill, are deſirous of more knowledge in the Art *of* Navigation, *and other* Mathematical Studies: *To you I commit the cenſuring of my Work, and heartily wiſh you the profit of my labours; knowing that the wiſe will rather wink at ſmall faults, then raſhly reprove that which may profit others, not pleaſure themſelves: And though (as I ſay) the curious and expert Mariners find nothing herein contained, which may ſatisfie their expectation, yet I hope they will judge favourably of my intentions, and with patience paſs it over for affection to the Art it ſelf, wiſhing charitably that my skill were anſwerable to my will: As for the meaner ſort whoſe Experience have not been fitted with Arts rudiment, nor their judgment fined with demonſtrative illuſtrations in the* Mathematical Sciences, *but only are now (as it were) ſetting themſelvs with willing minds to learn what before they wanted: I make no queſtion, but as by theſe following* Tables *and* Propoſitions *they may reap profit; ſo accordingly, in yielding friendly cenſures upon me and my Work, they ſhall anſwer my expectation with full recompence of my paſſed Labours: So intreating the courteous* Readers *to do me that favour, as to correct what they ſhall find amiſs, either in the* Printer's *over-ſight or mine own errour: I ſhall not only endeavour the mending of them in the next* Impreſſion, *but be very thankful for them, when at any time they ſhall give me notice thereof, reſting withal,*

Your obliged friend,

JOHN TAP.

To the Ingenious *SEA-MAN.*

THis Book needs no Commendations, having for a long time past so currently through the hands of most Men. Indeed it is a Compendium *(if well understood) of the whole* Art *of* Navigation: *But its chiefest excellency consists in the* Astronomical *part thereof; the* Tables *whereof are so plain and full, and well ordered, that there never were the like in any Book. And though these* Tables *are subject to grow old, and wear out of date; yet such hath been the good fortune of the Book, and the care of the* Stationer, *that the quick sale of the Book hath encouraged him still to renew the* Tables; *for this means, the Book hath not only been preserved in its first excellency and exactness, but hath from time to time received the Friendly Additions of Mr.* Henry Bond, *an Antient Professor of these Arts. And whereas the Revisal thereof hath lately fallen into my hands, finding the Book to be of so great use, and so agreeable to my* Genius, *I have been the more careful to make such Additions and Corrections, as will (I hope) be for the Advancement of the Book, and the advantage of the Buyer: So wishing all prosperity to attend your Sails, I rest*

Yours,

HENRY PHILIPPES

Philonauticus.

The SEA-MAN'S KALENDER.

Certain Definitions meet to be underſtood of thoſe that will practiſe Navigation.

A *Sphere* or *Globe* is a round Figure made by the turning of half a Circle, till it end where it began to be moved; or a maſſie body incloſed with one Platform or ſurface; in the middle whereof is a Prick, from which all Lines drawn to the ſurface are equal.

Centre is the Point or Prick afore, in the middle of a *Sphere*, *Globe*, or other Circles.

Diameter is a Right Line drawn through the Centre to the Circumference, or Surface of a *Sphere* or Circle to each end thereof.

Circumference is a round Circle equally diſtant on all ſides from the Centre thereof.

Surface or *Superficies* is the upper part of any thing.

A *Degree* is the 360 part of the Circumference of any Circle.

A *Minute* is the 60 part of a Degree, being underſtood of Meaſure: But in Time, a Minute is the 60 part of an Hour, or the fourth part of a Degree; 5 Deg. anſwering to an Hour, and 4 Min. to a Degree.

The *Pole* is a Point or Prick imagined in the Heavens, whereof there are two; the North Pole being a Centre to a Circle diſcribed by the motion of the *North Star*, or the Tayl of the *Litt'e Bear*; from which Point aforeſaid is a Line imagined to paſs through the Centre of the Earth, and paſſing directly to the oppoſite part of the Heavens, ſhewing the South Pole.

The *Equinoctial* is a great Circle imagined in the Heavens, alſo dividing the Heavens into two equal parts, and lying juſt in the middle betwixt the two Poles, being in Compaſs from Weſt to Eaſt, 360 Degrees; every Degree thereof on the Terreſtrial Globe, valuing 20 *Engliſh* ~~Miles~~ or 60 Miles.

Leagues

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The *Meridian* is a great Circle dividing the Equinoctial at right Angles into two equal parts, passing also through both the Poles, and the *Zenith*, to which Circle the Sun coming twice every 24 Hours, maketh the middle of the Day, and the middle of the Night; every place hath a several Meridian, but they all meet in the Poles of the World.

Zenith, is a Point or Prick in the Heavens right over our Heads, 90 Degrees from the *Horizon*, as the Pole is 90 Degrees from the Equinoctial.

Nadir is a Point or Prick in the Heavens under our Feet, opposite to the *Zenith*.

Horizon is a great Circle dividing that part of the Heavens which we see, from the other part we see not.

Azimuth is a great Circle crossing the *Horizon* at right Angles, as the Meridians do the Equinoctial, being as many as the Meridians, and as the Meridians concur and meet together in the Poles of the World, so do the *Azimuths* meet in the *Zenith*, which is the Pole of the *Horizon*.

Parallels, are Lines or Circles equally distant in all parts one from another, as all Circles of East and West are parallel to the Equinoctial.

Almicantaraths, are Circles parallel to the Horizon, being also Circles of Altitude or Elevation, being that the Altitude of the Sun, Moon, or Stars, above the Horizon are described thereby: which *Almicanters* do cross the *Azimuths*, as the Parallels or Circles of East or West do cross the Meridians.

The *Tropicks* are two lesser Circles, parallel to the Equinoctial, limiting the bounds of the *Zodiack*; or the greatest Declination of the Sun on each side of the Equinoctial. The *Tropick* of *Cancer* Northward, the *Tropick* of *Capricorn* Southward, whose distance from the Equinoctial are in these times, according to the best Observations, 23 Deg. and 32 Min. *ferè*.

The *Zodiack* is a great Circle, crossing the Equinoctial in two opposite places thereof, and swerving Byas-wise therefrom, towards either of the Poles, touching the *Tropick* of *Cancer* on the North part, and the *Tropick* of *Capricorn* on the South part thereof. In the *Zodiack* are 12 Signs, viz. *Aries*, *Taurus*, *Gemini*, *Cancer*, *Leo*, *Virgo*, *Libra*, *Scorpio*, *Sagittarius*, *Capricorn*, *Aquarius*, *Pisces*; every Sign being 30 Deg. in length, and 12 in breadth: Through which Signs

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the Sun passing describeth a Year, and the Moon passing likewise through the same maketh a Month: the 12 Degrees that the *Zodiack* hath in breadth, are allowed for the Latitude of the Planets.

Ecliptick is a Circle lying just in the middle of the *Zodiack*, out of which the Sun never goeth; but the Moon, and other Planets, are sometimes on the one side, and sometimes on the other side thereof.

The *Head* and *Tayl* of the Dragon, are two opposite Points in the Ecliptick-Line of the Zodiack, which goeth backwards through all the 12 Signs in 19 Years; and when it happeneth that the Sun and Moon are in conjunction or opposition in that place of the Ecliptick, where the Head or Tayl of the Dragon is, then is the Sun or Moon Eclipsed: Each of the other Planets also have their proper Dragons Head and Tayl; but this of the Moon is most notable in regard of the Eclipses.

The *Polar Circles* are two little Circles distant from the Poles of the World, so much as the greatest Declination of the Zodiack from the Equinoctial; in which Polar Circles are the Poles of the Zodiack. The one of these Circles being about the North Pole, is called the *Artick* Circle; the other being about the South Pole, is called the *Antartick* Circle. Some say these two Circles include all those Stars which neither rise nor set in any Latitude, but are always above the *Horizon*, where neither of the said Poles are raised.

The *Colures* are two great Circles passing through both the Poles, crossing one another in the Poles at right Angels, and dividing the Equinoctial and the Zodiack into 4 equal parts, making thereby the 4 Seasons of the Year: the one Colure passing through the Equinoctial Points of *Aries* and *Libra*, sheweth the beginning of the Spring-time and Autumn, at which two times the Days and Nights be equal; the other Colure passing through the two Tropical Points of *Cancer* and *Capricorn*, sheweth the beginning of Summer and Winter; at two which times the Days are longest and shortest.

Altitude in the Heavens, is the height of any thing above the Horizon towards the Zenith.

Latitude, is the wideness and distance of the Planets or Stars from the Ecliptick, either Northward or Southward. Also Latitude is the distance of the Zenith of any place from the Equinoctial towards either of the Poles, which is always equal to the height of the Pole of the same place.

Longi-

Longitude, is Length, and in the Heavens, it is understood the distance of any Star or Planet from the beginning of *Aries*, to the place of the said Planet or Star; or from the beginning of any Sign to a certain other part or Degree of the same: Otherwise Longitude in the Earth, is the distance of the Meridian of any place from the Meridian which passeth over the Isles of *Azores*, where the beginning of *Longitude* is said to be. *Longitude* is counted upon the Equinoctial, and *Latitude* upon the Meridian.

Declination is a declining or distance of the Sun, Moon, or Stars from the Equinoctial, and is said to be North or South, according to the Pole toward which it leaneth.

Amplitude is the distance of the Rising and Setting of the Sun, Moon, or Stars, from the true East or West Points of the Compass upon the Horizon.

Ascension is the Rising of any Star, or of any parts of the Ecliptick above the Horizon. *Right Ascension* is the number of the Degrees and Minutes of the Equinoctial, which cometh to the Meridian with the Sun, Moon, Star, or any part of the Ecliptick.

Oblique Ascension is the number of the Degrees of the Equinoctial, which cometh to the Horizon with any Star, or any portion of the Ecliptick; in which sort is *Oblique Descension* also.

Ascensional Difference is only the Remainer, the one being Substracted or taken from the other.

The *Golden Number* or *Prime*, is the time of 19 Years; in which time the Sun and Moon make all the variety of their Conjunctions, Oppositions, and other Aspects.

Epact is the 11 Days and 6 Hours, which are added to the Year of the Moon, being 354 Days, to make it equal with the Year of the Sun, which consisteth of 365 Days $\frac{1}{4}$. By the *Prime* is found out the *Epact*, and by the *Epact* the Age of the Moon.

The *Circle of the Sun* is the number of 28, because that in 28 Years are all the variety of *Dominical* or *Sunday* Letters, and Leap-Years are expired, being that at the 29*th* Year the Circle doth begin again: The use of which Number is to find out the *Dominical* Letter for any Year past, present, or to come: Where note, that there is but seven Letters which serve for *Sunday* Letters, (*viz*) *A, B, C, D, E, F, G.* And albeit that in the Days of the Week they proceed according to their natural order of the Alphabet, yet in the Years

Years they go backwards: As if *G* were for one Year, *F* shall be for the next; and when it is Leap-year, (which is every fourth Year, then is there two Letters for the Year, the first serving from the first of *January* till St. *Matthias*'s day, which is then the 25*th* of *February*, and then the other Letters takes place, and serves till the Years end.

To find which Number of the Suns *Circle*, and consequently the *Dominical* Letter for the Year proposed; To the Year of our Lord add 9, that total Divide by 28, and that which Remains is the *Circle* of the Sun for that Year. Then to know the Dominical Letter: Note that the 28 Year the Dominical Letter is *A*, and is the third from the Leap-year, therefore the first to begin withal again, is *G F*, because it is another Leap-Year: And so counting the 7 Letters backwards, and every fourth Year counting two Letters; That Letter upon which the Number of the Suns *Circle* ends, shall be the Sunday Letter for the Year proposed.

As for Example.

Let the Year proposed be 1675, add 9 thereto and it makes 1684, that being Divided by 28, the Remainer it 4, the Circle of the Sun: Then counting 4 Letters backward, according to order, till I have counted four places, beginning with *G F*, thus: 1 *G F.* 2 *E.* 3 *D*, *&c.* I find the fourth place ends upon *C*, which I conclude to be the Dominical Letter for the Year aforesaid. And it is the third after Leap-Year.

And here it is to be Noted, that the *Prime* and *Dominical* Letter changes the first day of *January*, and the *Epact* the first day of *March*.

To find out the Prime.

Divide the Year of our Lord by 19, and to that which remaineth after the Division, add 1: The Product is the *Prime* number for all that Year.

The Suns Circle and Dominical Letter.

1	G F
2	E
3	D
4	C
5	B A
6	G
7	F
8	E
9	D C
10	B
11	A
12	G
13	F E
14	D
15	C
16	B
17	A G
18	F
19	E
20	D
21	C B
22	A
23	G
24	F
25	E D
26	C
27	B
28	A

As for Example.

I would know the *Prime* for the Year 1675. Divide 1675 by 19, and you ſhall have in the Quotient 86, and after the Diviſion there reſts 1, unto which if you add 1, it makes 4; which is the *Prime* for that year 1675.

To find out the Epact.

Prime	*Epact.*
1	11
2	22
3	3
4	14
5	25
6	6
7	17
8	28
9	9
10	20
11	1
12	12
13	23
14	4
15	15
16	26
17	7
18	18
19	29

ADD to the Epact of the Year paſt 11, and if it paſs 30, take away 30; and the Product is the Epact for all that Year: But otherwiſe, which is the better way; Imagin three places upon your Hand; which for Example, let be the three Joints of your Fingers, and call or name the firſt Joint 10, the ſecond 20, the third 30; then count the Prime Number upon the three Joints aforeſaid, and going over them until you come to the end of the ſaid Prime Number, mark upon which your Prime ends; and adding the Number of the Joint with the Prime, if they come not to 30, that ſhall be the Epact for all that Year: If they paſs 30, take away 30, and the Remainer is the Epact; If it be juſt 30, then is the Epact equal to the Prime.

As for Example.

The Year 1675, the Prime is 4, and imagining the firſt Joint of my Finger to be 10, the ſecond 20, the third 30; I count upon the three Joints 4, the Prime Number, *(viz.)* upon the firſt Joint I tell 1, on the ſecond 2, on the third 3. Again, on the firſt 4, which is the Prime ending upon the firſt Joint, which I call 10; therefore adding 10, the Number of the firſt Joint, making 14 for the Epact of the Year 1675, aforeſaid.

To know the Moons Age.

ADD to the day of the Month, the Epact; and ſo many dayes more, as are Months from *March*, to the Month you are in, including both Months, and if they come not to 30, ſo much is the Noons age: But if they paſs 30, take away 30, and the overplus is the Moons age.

This is when the Month hath 31 dayes; but if the Month hath but 30 dayes, you muſt take away but 29, and the reſt is the age aforeſaid;

aforesaid; for in those Months that have 31 dayes, the Conjunction is the 30*th* day of her age; and those Months that have but 30 dayes, the Conjunction is the 29*th* day of her age.

For Example.

The first of *January*, 1675. I desire to know the age of the Moon: Because the *Epact* changeth not till the first of *March*: I add the *Epact* of the Year before, which is 3, and the day of the Month 1, together, which makes 4; then *January* being the 11*th* Month from *March*, added thereunto, makes 15, which is the age of the Moon, the said first of *January*. 1675.

A Declaration of the following Instrument, for the Tides.

THis Instrument gives you a plain and easie Order for the shifting of the Sun and Moon for every day of her age: and also it is a ready and most necessary reckoning of the Tides, whereby also is shewn the common Order, to bring thereby the 32 Points of the Mariners Compass to the 24 Hours of the Day and Night, which are the first Rudiments to be learned of a young Scholar, or Apprentice in *Navigation*.

First, here is the common Mariners Compass, with the xxxij Points thereof plainly set down, the Names being Printed upon each several Point, which must be perfectly learned without Book; then is there in the uttermost Edge a Circle divided into 24 parts, which signifie 24 Hours of the Day and Night; where you may see that Twelve a Clock at Night is just upon the North Point of the Compass; Twelve at Noon upon the South Point of the Compass: at Six a Clock in the Morning upon the East, and at Six at Night upon the West Point of the Compass; and so for the other Points of the Compass agreeing with the other Hours, every Point of the Compass, makes $\frac{1}{4}$ of and Hour; as you may see North and by East is upon $\frac{1}{4}$ of an Hour past Twelve, North Northeast one Hour and $\frac{1}{2}$ Northeast and by North Two Hours and $\frac{1}{4}$, and so of the rest.

Also to the Centre of the Compass is fixed a moveable Circle, to turn round about the said Compass, the uttermost Edge whereof moving close within the Circle of Hours, is divided into 29 equal Parts and a half, signifying the days of the Moons age, which are numbred in Arithmetical Figures from the first day of her Age, to

her Conjunction or meeting again with the Sun, at which place of her Conjunction is left a little Index or ſhewer, to direct you to the Hours and Points of the Compaſs: Which Index alſo ſhews how much the Sun and Moon are aſunder, every Day of her age, by telling the Points of the Compaſs betwixt the Number of the Moons age in the ſaid moveable Circle, and the Index thereof, accounting for every Point 11 Degrees and $\frac{1}{4}$; Or elſe the Number of the Hours contained in the uttermoſt Circle betwixt the ſaid Number of the Moons age, and the Index; accounting every Hour for 15 Degrees, ſhews the Degrees of Diſtance betwixt the Sun and the Moon.

Now for to keep reckoning of the Tides thereby, you muſt know by the Table hereafter ſet for that purpoſe how it flows: that is to ſay, what Moon makes full Sea, or High-water at that place where you would know the time of the Tide or High-water for the day propoſed: Which known, you muſt alſo by the former Propoſitions, or elſe by the *Kalender* following, know the Moons age; then ſeeking out the Number of the Moons age in the moveable Circle, place the ſaid Number of the Moons age upon the Point of the Compaſs, which makes full Sea upon the Change day at your place deſired; and ſtaying it there, the Index which is in the ſaid moveable Circle, points you directly to the Point of the Compaſs that the Sun be upon, when it ſhall be High-water on the foreſaid day in the deſired place; and alſo in the uttermoſt fixed Circle, it ſhews the Hour of the Day which you deſire.

For Example.

Suppoſe the Moon to be 7 days old, I would know how much the Sun and Moon are a ſunder; I ſeek in the moveable Circle for the Moons age, which being 7, I place 7 upon the North Point of the Compaſs, and the Index ſhews the Eaſt and by North, and $\frac{1}{4}$ to the Eaſtward, which is 7 Points and $\frac{1}{4}$, that Multiplyed by 11 $\frac{1}{4}$ the number of Degrees that belong to a Point of the Compaſs, makes 87 Degrees 32 Min for the diſtance betwixt the Sun and Moon, and in Hours it ſhews 5 $\frac{1}{4}$, which multiplyed by 15, yields the like, being very near $\frac{1}{4}$ of the Zodiack.

Then for the Tides, at *London-Bridge*, it flowes Southweſt and Northeaſt, or is High-water at 3 a Clock on the Change day, therefore when the Moon is 6 dayes old, I place 7, the Moons age upon

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the Point Southweſt, or 3 a Clock, and ſtaying the moveable rundle there, I ſee that the *Index* ſhews almoſt Northweſt, which is 40 Minutes neareſt hand, or near 3 quarters of an Hour paſt 8 a Clock, at which time ſhall be High-water at *London Bridge*, the Moon being 7 dayes old.

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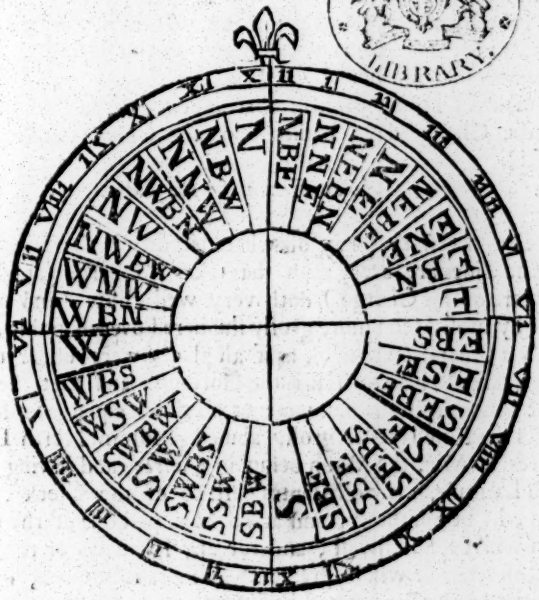

Again, at *Harwich* where it flows South and by Eaſt, the Moon being 10 dayes old, I lay 10 (the Moons age) upon that Point of the Compaſs South and by Eaſt, and then the *Index* ſhews the Point Weſt Northweſt of the Compaſs, and in the Circle of Hours one third part of an Hour paſt 7, which is the time of the Full Sea at *Harwich*, the Moon being 10 dayes old.

But

But if you want a Table, or Inſtrument to work the Account of the Tides, you may do it by memory, Multiplying the Moons age by 4, and Divide the Product by 5; and for the Quotient, add for every Unity which remains upon your Diviſion 12 Minutes, that total add to the Hour that it makes full Sea on upon the Change day, the Product ſhall be your deſired Number.

As in the former Example, the Moon 7 dayes old, and the high Water at *London* on the Change day at 3 of the Clock; I Multiply 7 (the Moons age) by 4, it makes 28, that Divided by 5, the Quotient is 5, and 3 remains upon the Diviſion, which 3 being ſo many times 12 Min. makes 36 Min. which added to 5 in the Quotient, makes 5 Hours 36 Min. that added to 3 the Hour of full Sea, upon the Change day, makes 8 of the Clock, and 36 Min. as aforeſaid.

An exact way for the Tides.

HOw neceſſary (nay of what neceſſity) the true account of the Tides are, every man that takes a Charge (at leaſt he that takes care of his Charge) doth very well know; and yet no one thing (by moſt Men) more groſly ſlubbered over than this, for there is only a general Rule uſed, as if all places were under the North-Pole, where the Equinoctial is the Horizon, and that the departure of the Moon from the Sun were at all times equal; in both which reſpects the Rule is moſt groſly abuſed; for in North Latitude 51 Degrees 30 Min. the Moon being in *Cancer*, and having 5 Degrees North Latitude, it is 30 Minutes paſt 10 of the Clock, before the Moon will be Southeaſt, and at 30 Min. paſt one of the Clock, the Moon will be Southweſt, and for any Point nearer to the Eaſt or Weſt, the Errour will be greater. Alſo, if it be in 30, or 40 Deg. of Latitude, the Errour will be far greater.

The miſ-account of which time from a High-water, may caſt away Ship and Goods, in going into Harbour where water is ſcarce, where it is to be looked unto and reſpected. To correct this Errour, I will here propound a very exact, eaſie, and ſpeedy way to account the Tides:

Firſt, you muſt underſtand, that in obſerving the Tides, the beſt way is to go by the time of the day ſhewed by the Inſtrument, and not by the Moons being upon ſuch a Point of the Compaſs: M

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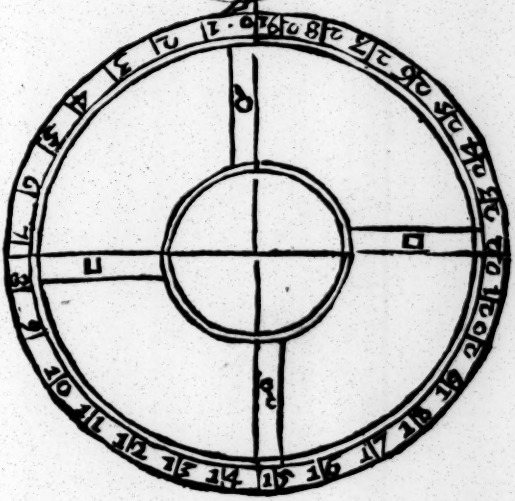
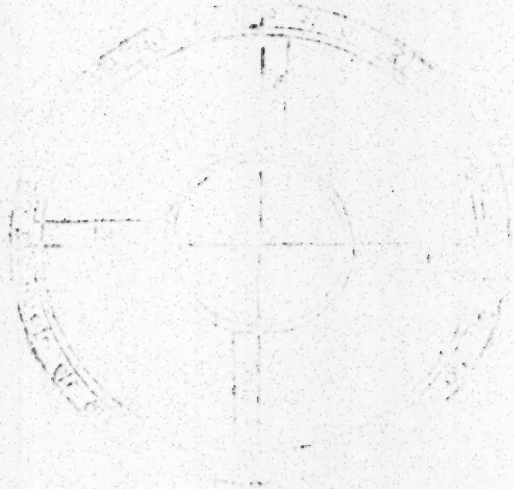


The four white quarters within the utmoſt Circle are to be cut out, and then the Figure to be placed upon the *Compaſs* on the former Leaf.



meaning is thus. The Table ſhews it is high Tide at *London*; the Moon being South-Weſt, and this by the Inſtrument is at 3 a Clock on the day of the new or full Moon. Now it is true, it is always high Tide at *London* at 3 of the Clock on the day of the new or full Moon: But if you ſhould obſerve the Moon in the Heavens by your Compaſs, you ſhall find, that the Moon is not always South-Weſt at 3 of the Clock upon the day of the new and full Moon.

For Example.

At the New Moons in *June*, and the Full Moons in *December*, the Moon is about the Tropick of *Cancer*, and then in the Latitude of *London*, ſhe is South-Weſt at 3 quarters of an Hour paſt one of the Clock, but it is not high Tide till 3 of the Clock, and then the Moon will be Weſt South-Weſt, which is two Points further.

Alſo, it is very neceſſary to obſerve the difference which is between the Neap-Tides, when the Moon is in the quarters, and the Spring-Tides at the new and full Moon. For the Neap-Tides will be an Hour and ſomewhat more, ſooner than the Inſtrument doth ſhew them.

For Example.

The Moon being in the firſt Quarter, the Inſtrument ſhews that it is high Tide at *London*, at 9 of the Clock: But if you obſerve the time of the Tide, you ſhall find that it is high Tide before 8 of the Clock. The like difference (I believe) is in other places. Therefore to know the true time of the Tide, you muſt Subſtract ſome Minutes from the time ſhewed by the Inſtrument, according to the age of the Moon, as is ſhewed by this little Table.

The Moons age.					H.	M.
1	14	16	29	Subſtract	0	0
2	13	17	28		0	5
3	12	18	27		0	10
4	11	19	26		0	20
5	10	20	25		0	40
6	9	21	24		0	45
7	8	22	23		1	00

For Example.

The Moon being 5 Dayes old, it is high Tide at *London* by the Inſtrument at 7 a Clock; but you muſt by this Table Subſtract 30 Min. from this time, and ſo the true time of the Tide at *London* is at 6 of the Clock and 30 Minutes.

The Government of the Planets.

DIvers Writers have diſagreed concerning the Planetary Hours; ſome making the Hours of the Planets equal with the Hours of the Clocks, and ſo continuing their Regiment orderly with the

other common Hours; ſome again, beginning the ſaid Planetary Hour at Noon, ſome at Midnight, and ſome again at Sun Riſing: Which indeed for the time of the beginning of the Accompt is beſt, and for the difference of the equality and inequality between the Planetary Hours, and the common Hours of the Clock. *Gemma Friſius*, agreeing with the beſt Aſtronomers, ſaith, That as the dayes and nights do increaſe or decreaſe, ſo muſt the Planetary Hours be longer or ſhorter accordingly; nevertheleſs, ſo that there ſhould be 24 Planetary Hours in the day and Night, as well as of other Hours: But that if the day conſiſt of more than 12 Hours, then proportionably the Planetary Hours to conſiſt of more than 60. Min. And if the day be leſs than 12 Hours, then the Planetary Hours are to be leſs than 60 Min. And if the day be juſt 12 Hours, then the Planetary Hours are equal to the Hours of the Clocks, and not otherwiſe. The like is to be underſtood in the Nights, and to make an equality of the Planetary Hours, to them of the Clocks, being that how long ſoever the day is, yet there muſt be but 12 Planetary Hours; and how ſhort ſoever the day is, there muſt (never theleſs) be 12 Planetary Hours, which are ſometimes greater, and ſometimes leſs than the common Hours of the Clock, which alwayes conſiſt juſt of 60 Minutes; Therefore, if you divide the day into 12 equal parts, one of theſe parts, ſhall be the quantity of a Planetary Hour, which you may do thus: Multiply the Hours of the Day into Minutes, by 60, and if their be any odd Minutes add them to the Product the Total being Divided by 12, the Quotient ſhews the number of Minutes contained in an unequal or Planetary Hour.

And again, if at any Hour of the Day or Night, you know not what Planetary Hour it is, that is to ſay, how many Planets ruled ſince the beginning of the day or night propoſed, Multiply the number of the Hours paſt, from Sun-riſing by 60, and Divide the Product by the number of the Minutes contained in an unequal or Planetary Hour, the Quotient will ſhew you how many Hours and Minutes of the Planets are paſt from Sun-riſing (if it be in the day) or from Sun-ſetting, (if it be in the night,) which known, enter the Table following, to know what Planet rules that Day and Hour propoſed, looking for the Hour deſired in that Column, which is right under the day propoſed: Thoſe Planets which are Governours of the ſaid Hours in the Day-time being placed on the ſide next the left hand, and the Gouernours of the Night next on the right hand. *Exam-*

Governours of the Day.	Sunday	Munday	Tuesday	Wednesday	Thurday	Friday	Saturday	Governours of the Night
Sol	01	11	09	00	10	00	11	Jupiter
Venus	02	00	10	00	11	01	12	Mars
Mercury	03	00	11	01	12	02	00	Sol
Luna	04	01	12	02	00	03	00	Venus
Saturn	05	02	00	03	00	04	01	Mercury
Jupiter	06	03	00	04	01	05	02	Luna
Mars	07	04	01	05	02	06	03	Saturn
Sol	08	05	02	06	03	07	04	Jupiter
Venus	09	06	0	07	04	08	05	Mars
Mercury	10	07	04	08	05	09	06	Sol
Luna	11	08	05	09	06	10	07	Venus
Saturn	12	09	06	10	07	11	08	Mercury
Jupiter	00	10	07	11	08	12	09	Luna
Mars	00	11	08	12	09	00	10	Saturn

Example.

The 17 day of *May*, being Sunday, at 9 of the Clock in the Morning, I would know what Planet rules; First, in the following Kalender, I find that the 17*th* of *May*, the day being 16 Hours long; therefore I Multiply 16 Hours by 60 Minutes, and the Product is 960. That Divided by 12, brings in the Quotient 80 Minutes, for the length of the Planetary Hour at that time; then from four of the Clock, (the time of the Suns Rising) till Nine a Clock, the Hour proposed, is 5 Hours, which Multiplyed by 90, brings 300, that Divided by 80, (the length of the Planetary Hour) brings in the Quotient 3 Hours, and there Remains upon the Division $\frac{60}{80}$ Parts, that is, three Quarters of a Planetary Hour more: So I conclude, that at Nine of the Clock, 3 Planets have past their Regiment, and the fourth hath Ruled 3 Quarters of his Hour: Therefore under the Title *Sunday* in the top of the Table I look for 4 towards the Foot of the said Table, against which on the Left hand is placed *Luna*; therefore I say, that the 17*th* of *May*, being Sunday, at Nine of the Clock in the Morning, *Luna* shall have reigned three Quarters of her Hour.

A Rutter for the Courſes round about *IRELAND*, from Cape to Cape, and what Tide it makes in every Harbour, and how many Leagues it is from Harbour to Harbour.

IN Primis, from *Cape-Cleer* to the *Miſon-head* is 7 Leagues, and lieth Weſt and by North, and Eaſt and by South; you ſhall find a Haven North-Weſt from *Cape-Cleer*, called *Crook-Haven*, and it floweth there Eaſt North-Eaſt, and Weſt South-Weſt; you muſt go Weſt to enter into it.

From the *Miſon*, to the *Durzib*, is 7 Leagues, and lyeth Weſt North-Weſt, and Eaſt South-Eaſt.

Beer-Haven, lyeth from the *Miſon-head*, North North-Weſt 3 Leagues and a half: You muſt go North-Weſt into the Haven, it floweth Eaſt North-Eaſt, and Weſt South-Weſt: If you will Anchor between *Durzib*, and the Main Land, you muſt go aboord the Iſland, for the Eaſt ſide is not ſound.

The three Iſlands that be off the Point of the *Dourzies*, which is called the *Bull*, and *Cow* and *Calf*, they be ſound, and you may go within them, or elſe between them, for there is no danger, but what you may ſee.

Dourzies, and *Blaskey*, lie North and by Weſt, and South and by Eaſt, and there is betwixt them 12 Leagues; the *Skellocks* is between both, and it floweth North-Eaſt, and South-Weſt.

North-Eaſt off the great *Skellocks*, at 2 Leagues off you ſhall find the entry at *Valens*, you muſt run Eaſt South-Eaſt to enter in, it floweth Eaſt North-Eaſt; you muſt borrow of the Iſland to enter in, for the Point on the Eaſt ſide is long.

North North-Eaſt of the great *Skellocks* 6 Leagues off, you ſhall find the Haven of the *Ventry*, which is a good Road: It floweth Eaſt North-Eaſt.

North-

North-East by North off the great *Skellocks* 7 Leagues you ſhall find the Haven of *Dingle*, and without the Haven is a Rock called the *Croo*, which is found on both ſides: The Rock doth not cover but on a Spring-Tide; you muſt run North-Weſt and by Weſt into the Haven, in floweth East North-East, and Weſt South-Weſt.

The *Ventry*, and the Sound of *Begue* lyeth South and by East, and North and by Weſt 3 Leagues, and when you are paſſed into the Sound of *Begue*, you muſt lie East and by North into the Rode againſt a red Cliff, which is on the South ſide.

South-East of the Sound of *Blaskey*, at 6 Leagues off, you ſhall find a good Harbour named *Begue*, which is to the North-East off *Valence*: the ſaid Haven hath two Entries, but the Weſt ſide is the beſt: You muſt take great heed of a ſunk Rock that is on the Iſland ſide, which you muſt leave on your Larboard ſide going in, and it floweth East North-East, and Weſt South-Weſt.

You ſhall underſtand that the Sound of *Blaskey* lyeth South-East, and North-Weſt; but you muſt take heed of a Shoald that is on the East ſide, athwart the *Sizabras*.

From *Blaskey* to *Smirrick* is 3 Leagues; and if you enter into the Haven, you muſt go South-Weſt into it: it floweth East North-East, and Weſt South-Weſt.

There is a Hill to the Eaſtward of *Smirrick*, which is called *Sinbrandon*, go from *Smirrick* East North-East, and you ſhall go with *Lopus-head*, which maketh entry of the River of *Limerick*, on the North ſide: There is from one to the other 10 Leagues.

Smirrick, and the head of *Kerry* lie East North-East, and Weſt South-Weſt, 7 Leagues aſunder, and there is within the Bay three Iſlands called *Sailline*.

From *Laupſhed* to the *Seaves*, is 7 Leagues, they lie East North-East, and Weſt South-Weſt: and if you enter into the River, take heed of a ſhoald half way between *Laupſhed*, and an Iſland called *Scitrick*, which you muſt leave on the South ſide, and to the Eaſtward of that Iſland is a good Road: It floweth East North-East, and Weſt South-Weſt.

From *Scatrick* to *Quoin* is 5 Leagues: You muſt go East, and you ſhall find two Iſlands, they be flat Iſlands; go to the Northwards hard Aboord them, and from thence run East North-East, and you ſhall find a Rock called the *Bieff*, go hard Aboord the South

ſide

ſide of the ſaid Rock called the *Bieff*, and when you are at the ſaid Rock you muſt row South-Eaſt, and you ſhall find another Rock called the Small *Bieff*, then go with the Iſland of the entry of *Dorſey*, and borrow aboord the Iſland as neer as you can, for fear of the Bank going into the Haven, and you muſt Moor at the Caſtle by your Cables, for there goeth a great Tide, it floweth Eaſt North-Eaſt, and Weſt South-Weſt.

The Sound of *Blaskey*, and the Iſlands of *Arran*, lyeth North North-eaſt, and South South-Weſt, and there is between them 16 Leagues: The Iſlands lie Eaſt and Weſt, and makes the entry of *Gallway*, and of the other Iſlands: There is one which is naught, but the Weſt Sound is good, and the next Sound to it is good, which is called the Little Sound; but the Sound coming from the Eaſt is naught, but the next coming to the *Black ſhore* from the Eaſt is partly good, but you muſt put the two partitions to the Iſland, for it is dangerous: You muſt underſtand that there is one Iſland in the Courſe way betwixt *Lawpſhed*, and the entry of *Gallway*, that had a great Ranie, a League and a half off the main Land.

If you go before the Town of *Gallway*, go aboord the *black ſhore*, and bring the *black ſhore* South-Eaſt of you, then go North-Eaſt, and you ſhall fetch the Iſland called *Motton Iſland*, and there is between them both 3 Leagues: You muſt not truſt to the North ſhore, for there is a Shoald half way to the *black ſhore*, and the Iſland of *Motton*, is thwart of two White Points, which is on the North ſide.

The ſaid Shoald is upon the Weſt South-weſt ſide of the ſaid Iſland of *Motton*, a League and a half off at a Spring Tide, then ſhall you ſee it dry, and it floweth at the ſaid Iſland Eaſt North-Eaſt, and Weſt South-Weſt.

The Sound of St. *Gregory*, and the Road of *Galve*, lyeth Eaſt North-Eaſt, and Weſt South-Weſt, and there is betwixt them 8 Leagues.

The Sound of St. *Gregory*, and *Silvis head*, lie South-Eaſt, and North-Weſt, and the diſtance between them is 9 Leagues.

Slinſhead and *Sark* lyeth North by Weſt, diſtant 15 Leagues.

Black rock is an Iſland which is Weſt of *Kilhead*, a League off the Cape, and the ſaid *Black rock*, and the *Stags* lyeth North Eaſt and by North, and are diſtant 12 Leagues.

From

From the ſaid *Black rock* run North, and you ſhall find the Iſland of Eaſt *Eaves*, and there is between them 2 Leagues.

South South-Weſt of the *Stags*, there is a Haven called *Broad-Haven*, from the Haven of the *Stags* is 2 Leagues: *Stags* is a Cape that maketh the entry of the River of *Raffen*, they lie Eaſt and Weſt, and are diſtant 8 Leagues: The *Stags* and the Cape of *Tellen* lie North-Eaſt and South-Weſt, and are diſtant 15 Leagues.

Betwixt the *Stags* and the Cape of *Tellen* in the Bay, is the Haven of *Moy*, the Haven of *Potway*, the Haven of *Sliego*, the Haven of *Ballſhanon*, the Haven of *Dongal*, the Haven of *Kellekeg*, and the Haven of *Tellen*.

The Cape of *Tellen*, and the Iſland of *Arran*, lie North North-Eaſt, and South South-Weſt, and are diſtant 7 Leagues.

The Iſland of *Raghlenbourn* and *Tellen*, lie South-Weſt and North-Eaſt, and are diſtant 2 Leagues.

The Iſland of *Raghlenbourn*, and the Iſland of *Torre*, lie North North-Eaſt, and South South-Weſt, and are diſtant 14 Leagues.

To the Eaſtward of *Torre*, is a Cape called *Hornhead*, and are diſtant 2 Leagues: South-Eaſt of *Hornhead* is a Haven called *Ship-Haven*, it floweth Eaſt to Weſt; but you ſhall have in the Bay a good Road for all Winds, the ſaid Haven is a broad Haven, and is 2 Leagues from the Cape.

Hornhead, and the entry of *Lough-foil*, lie Eaſt North-Eaſt, and Weſt South-Weſt, and are diſtant 6 Leagues.

The entry of *Lough-foil*, and the Iſlands of *Eneſterhould* lyeth North-Eaſt and South-Weſt, and are diſtant 5 Leagues.

The Iſland of *Torre*, and the Iſland of *Eneſterhould* lyeth Eaſt and by North, and Weſt and by South, and are diſtant 9 Leagues.

The entry of *Lough-foil* and *Eneſterhould* lye South-Eaſt and North-Weſt, and are diſtant 5 Leagues.

The Iſles of *Eneſterhould* and *Skerris-Portruſh*, lye Eaſt South-Eaſt, and Weſt North-Weſt, and are diſtant 10 Leagues.

You muſt underſtand, that the River of *Lough-foil*, lyeth from *Skerris-Portruſh*, Weſt South-Weſt, and Eaſt North-Eaſt, and there is between them the River of the *Band*: There is between *Portruſh* and *Lough-foil*, 5 Leagues: There is in the entry of *Lough-foil*, a Sand which is called the *Tonnes*, which is dangerous for any Ship of Charge: Alſo there is a Channel on the Eaſt ſide of the

Tonnes, hard aboord the Shore; but you muſt have your Tide: It floweth Eaſt and by South, and Weſt and by North. *Skerris* and *Portruſh* lyeth South and North, and are diſtant 12 Leagues. *Skerris*, *Portruſh*, and the Iſlands of the *Raghlings*, lie North-Eaſt and by Eaſt, and South-Weſt and by South, and are diſtant five Leagues: It floweth in *Skerris* Eaſt South-Eaſt, and Weſt North-Weſt; the Floud cometh from the Eaſtward.

Off the *Raghlings* is a Cape called the fair *Foreland*, and betwixt them is a League and a half: The fair *Foreland* and the *Knee* lyeth South South-Eaſt, North North-Weſt, and are diſtant 9 Leagues.

The fair *Foreland* and the *Loughrian* in *Scotland*, lie Eaſt South-Eaſt, and Weſt North-Weſt, and are diſtant 15 Leagues.

There is betwixt the *Knee* and *Carick-fergus*, 5 Leagues.

The Point of *Loughrian*, and the Iſlands of *Commoras* off *Scotland*, lie North and South; you muſt paſs by *Ellifo*, and by the Haven of *Lambach*, aſunder 7 Leagues.

The Point of *Loughrian* and *Compnam* Iſles, lie North-Eaſt and South-Weſt.

The *Knee* and the Rock of *Maidens*, lie North-Eaſt and by North.

The *Knee* and *Elſe* in *Scotland*, lie North-Eaſt and by Eaſt, diſtant 10 Leagues.

Lorian in *Scotland*, and the Mould of *Galve* lie South South-Eaſt, and North North-Weſt, and are diſtant 7 Leagues.

The Mould of *Galve*, and the *Calf* of *Man*, lie South South-Eaſt, and North North-Weſt, and are diſtant 10 Leagues.

The *Compnam* Iſles, and the Road of *Carrick-fergus*, lie Eaſt and Weſt, and are diſtant 14 Leagues: It floweth in the Sound, Eaſt South-Eaſt, and Weſt North-Weſt.

Compnam Iſles, and the Point of the *Moulens*, lie South South-Eaſt, and North North-Weſt, and are diſtant 7 Leagues.

The Point of the *Mouſnes*, and the Iſle of *Lambay*, lie South South-Weſt, and North North-Eaſt, and are diſtant 21 Leagues.

Lambay, and *Carlingford*, lie North North-Weſt, and South-Eaſt, and are diſtant 18 Leagues.

Lambay, and the Iſle of *Dalkie*, lie South South-Weſt, and North North-Eaſt, and are diſtant 5 Leagues.

The Bank of *Wicklow*, beginning thwart the North of *Dublin*, and continues to the Isle of *Tosker*, they lie North and by West, and South and by East, and they lie in length 24 Leagues.

Tosker, and the Point of *Grenord*, lie East and by North, and West and by South, distant 2 Leagues.

And when you are bound to the Eastward off the *Grenord*; you must keep the Mountain of *Wexford* above the low Land, and so you shall go clear of all dangers betwixt you and the Shore.

And if you close the Mount with the low Land, then you shall go with the dangers.

Tosker and the Cape of *Canwal* lie South and by East, and North and by West 40 Leagues.

Tosker and the *Salts* lie East North-East, and West South-West, distant 6 Leagues.

The *Salts* and *Silly* lie South and North, and are distant 33 Leagues.

The *Salts* and the Tower of *Waterford*, lie East and West, and are distant 5 Leagues.

The Town of *Waterford*, and the Isle of *Ballecutin*, lie South-West and by West, and North-East and by East: but between the Tower of *Waterford* and *Ballecutin* is a Haven called *Vognal*, and a Sea-board, it is an Island called *Capel-Isle*, and between *Capel-Island* and *Ballecutin* is 4 Leagues.

The Tower of *Waterford* and *Helvick head*, lie East and West, distant 3 Leagues.

Capel-Island and the Island of *Ballecutin* lie West South-West, and East North-East and are distant 3 Leagues and a half.

Ballecutin and *Cork-Haven* lie West and by South, and East and by North, and are distant 3 Leagues and a half.

Oyerst Haven and the *Old head* of *Kinsail* lie South-West, and North-East, distant 3 Leagues and a half.

The Haven of *Kinsale* lieth from the *Old head* North North-East and going in, you must keep *Bane Castle* open to the West-land.

The *Old head* and *Cape Cleer* lie West and by South, and East and by North, and are distant 14 Leagues.

Cape Cleer and *Silly* lie East South-East, and West North-West, distant 50 Leagues.

There lieth from *Faſten* a Haven called *Croock haven*, and is from it North-Weſt, diſtant 4 Leagues.

There is a Haven called *Scoll-haven*, which lieth from *Faſten* North and by Weſt, diſtant 5 Leagues.

There is a Head-Land half way betwixt the *Old head* of *Kinſale*, and *Baltamore*, which is called *Kendone edo*, and it lieth North-Weſt and by Weſt; from it is a good Haven called *Clendor*, there is a High-Land to the Eaſt-ward, you muſt go aboard that High Land, and ſo into the Haven. There is a ranny of Rocks on the Weſt Land that goeth to the Eaſt-wards: Therefore keep the Eaſt ſide, and when you come in, Anchor before the Caſtle: There lieth Weſt North-Weſt from the ſaid Head, a good Haven called *Caſtle haven*, 4 Leagues from it; and if you come out into the Sea, and meet with the *Stags*, you muſt go North-Eaſt into *Caſtle-haven*, and in the entry there is an Iſland, which you muſt leave on the Eaſt ſide of you, and another flat Iſland, which you muſt leave on the Weſt ſide of you; you may go dry at low water from it to the Main, for it is very nigh to the Weſt-land, but be bold on the Eaſtern Iſland, and go right with a Chappel that lieth on the Eaſt ſide of the Main Land, and when you are thwart of the Chappel, you ſhall ſee a Caſtle on the Weſt ſide, and thwart of the Caſtle, you may enter in 12 Fathom, it is from the *Stags* 3 Leagues and a half.

You muſt underſtand that the Flood ſhoot from *Dourze* to the *Old head* of *Kinſale*, North North Eaſt and the Ebb to the contrary, and from the *Old head* to the Tower of *Wate ford* North-Eaſt and South-Weſt, and from the *Dourze* to the North-wards, North North-Eaſt, and South South-Weſt.

If you will go in betwixt the *Caſh*, and the *North head* of the Grounds in *Dalkie*, you muſt bring a round Hill that ſtands like a Sugar-Loaf North North-Eaſt, and you ſhall have 10 Fathom: It floweth South-Eaſt along the Channel, and the Bar of *Poulbeg*. There is 8 Foot water upon it at low Water, and 3 Fathom at full Sea; Your Bar lieth South and North, and you ſhall have in the Road of *Poulbeg*, 14 Foot at low water.

To ſail from *Dalkie* to the Road of *Poulbeg*, you muſt keep a ſmall Rock open, a Hand-ſpike length, and when you come to the Bar, you muſt lie W. South-Weſt up into the Road with the Beacon, then muſt you anchor in 4 Fathom at High-water, for there are 2 Hills

Hills on the South-ſide, a high Hill, and a low round Hill, bring them both in one, and then you are in the beſt of the Road. A South South-Eaſt Moon makes a full Sea.

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A Note for going into MILFORD.

IF you come from *Milford*, you muſt leave all the Iſlands to the Weſtward, and when you have the *Graſhom* North North-Weſt, then the Haven beareth North-Eaſt and by North, and when you come into *Dall* Road, you may Ride in three Fathom and an half at low Water, it floweth Eaſt and by North.

Milford goeth in cloſe under *Cowin* and *Scabon*, to the Eaſtward, and when you come open of *Milford*, you ſhall ſee an Iſland like the *Mawſton*, which lieth on the Eaſt ſide; and in *Dall* Road you may ride for all Winds; the *Small* lieth from the *Graſhom* three Leagues, and between them lieth a Ledge of Rocks, which is dry at low Water; it lieth mid-way, and it is very dangerous coming between them.

A General and compendious Tide-Table, *shewing what Moon makes full Sea, or High-water in all these places following.*

Full Sea on the Coast of Zutphen, Friesland, Holland, Zealand, *and* Norway.

AT the *Jutlandish* Isles before the Rivers of *Hever*, *Fider*, and *Elve*, S & N
At *Ancuisen*, S & N
The Isle of *Urk*, before *Delf* Isle, at *Embden*, and all the shores of *Flanders*, S & N
Before the *Mae's-Deep*, E & W
At *Hambrough* and *Antwerp*, E & W
Underneath *Holy land*, W S W
At *Egmont* and *Harlem*, S E
In the *Bresand* and *Vourd*, W S W
Before the Eastern and Western Entrance of the *Emes*, or River of *Embden*, before all the Coast of *Friesland*, and the *Fly*, E S E
Before the *Ghests* of *Texel*, W S W
Upon the *Flats* of *West-Friesland*, *Wyering* and *Amsterdam*, S W
Without the banks at *Flanders*, S W
Dordretcht and *Zierick* Sea, S W
Rotterdam, and from *Harlem* to the River of *Maes*, S W
At *Ward-house*, E & W
At *Brihac*, E S E
Cape *Gallant*, S by E
The Havens of *Yotland* and *Norway*, S & N
At *Corpus Christi* Point, S S W
Before the *Fen*, in the Channel at *Horn*, *Edam*, Isle of *Gore*, before the *Maes*, before *Camser*, and *Terver*, S S W
Before the *Willing*, and all the Coast of *Zealand*, S S W
North-Cape and *Blangbrow*, S W
Fox Nose and St. *Nicholas* Road, W S W

Full

Full Sea on the Coasts of France, Spain, and Portugal.

AT *Blackneſs*, *Army*, *Rammekins* and *Camfer*, *S S W*
Within the *Foſie* of *Caen*, *S S E*
Calice-Road and *Deep*, *S S E*
At *Bolem*, *Calice*, *Graveline*, and *Dunkirk* Half-Tide, *S* & *N*
The Iſland of *Baſſe*, *S E*
Within the *Seyn*, before the *Caſquets*, and before *Garnſey*, *S E*
Before *Gherbrough*, and the Raſe of *Blanquet*, *S* & *N*
At *Newport*, half-Tide, *S* & *N*
At *Seyn-head*, *S S W*
At *Garnſey*, and before St. *Powl*, *W* by *S*
Bell-Iſle, and *Holy Iſle*, *S W* by *S*
Without *Uſhant*, and before *Burdeaux*, *E* & *W*
Britain, *Penmark*, *Poictu*, and *Gaſcoin*, *S W*
Raſe of *Fontnes*, *S* by *W*
Bloy and St. *Mathews*, *W S W*
Abboath and St. *Mallows*, *W* by *S*
Before the *Killiots*, *S W*
Portwiſe, and before the River of *Burdeaux*, *S W*
From the *Raſs* to the *Pole-head*, *S W*
Before the River of *Nantz*, and before the Bay, *S W*
In the Bay within *Uſhant*, *W S W*
At the *Sept Iſles*, and at *Calice*, in the Creek, *W S W*
Within the River of *Roan*, and from the *Polehead* of *Burdeaux* to the *Foreland* of *Fountains* before *Brouage*, in the River within all the Havens aforeſaid, it floweth, *S W* by *W*
At St. *John de Luzk*, *S S E*
At *Concalo*, and St. *Malo*, *E* & *W*
At Cape St. *Maries*, *E* by *E*
On all the Coaſts of *Biskay*, *Galicia*, *Portugal* and *Spain*, it floweth South-weſt & N. E.

Scotland.

IN St. *Magnes Sound*, *S E* by *E*
At *Fair* Iſles, *S E*
In the *Frith*, *S S E*
Fair Iſle Roads, *S* by *E*
At *Orkney*, *S E*

England.

AT *Barwick* it flowes, *S S W*
At the *Staples* half-Tide, *N E* by *E*
At *Hounciff-foot*, half-Tide, *N E* by *E*
At *Flambrough head* one quarter Tide, *E N E*
At the *Shoo*, *S* & *N*
At *Tinmouth* quarter-Tide, *S W*

At the *Spern*, W by S
Newcastle and *Humber*, W by S
Winte ton, E S E
Blacktail and the *Nowe*, S by W
Blackney and the *Shields*, W & E
Yarmouth, S E by S
Oxford and *Albrough*, S E by S
Whitbay and *Robin-hoods bay*, S W
Before *Hartlepool*, S W
Scarbrough one quarter-Tide, W S W
Hull and *Lin* half Tide, E & W
Before *Humbers* Mouth, N W
At *Burnham* one quarter-Tide, E & W
Cromer, S E
At *Lieſtow* a quarter-Tide, S S E
Harwich and *Dover*, S S E
Harwich within, S by E
South *Foreland*, S S E
Before *Margate* and *Thames-mouth*, S by E
Leigh and *Kentiſh Knot*, S & N
Spits and along the *Swine*, S & N
Between *Tinmouth* and *Flamborough head*. S W
Between *Flamborough-head*, and *Bridlington-Bay*, S W by W
Between *Bridlington* and *Lawrenas*, W S W
Between *Lawrenas* and *Cromer*, along the Well, half Tide, E & W
Between *Cromer* and *Yarmouth* Road, S E
Between *Laſtiow* Road, and *Orfordneſs*, S E by S
Between *Orford* and *Orwel* Waves, S S E
Between the *Naſe* and the *Warehead* of *Coln*, S by E
At the Weſt end of the *Nore*, S by W
Rocheſter and *Malden*, S by W
At *Graveſend*, S S W
London, and the midſt of the *Heads* or *Straights*, S W
At the *North Forelands*, S S E
At *Beachy*, S & N
Seven *Cliffs*, S E
In the *Downs*, S S E
In the *Chamber*, and at *Gore-end*, S by E
At *Chamberneſs*, and at the *Needle*, S E by S
In *Chamberneſs* Road, S S E
Portſmouth, *Hampton*, and the Iſle of *Wight*, S & N
In the *Offing* from the North *Foreland* to the South *Foreland*, it runneth half Tide, and from the South *Foreland* to the *Neſs*, it runneth half Tide, and half quarter Tide, and from the *Neſs* to *Fairly* one half Tide, and from *Fairly* to *Beachy*, one quarter-Tide under other.
At *Portland* Road, E S E
At St. *Elens*, S E by E
Within the *Raſe* of *Portland*, at *Pool* in the Haven: at *Homehead*, and thwart of *Plimouth* and *Dartmouth*, S E
At *Waymouth*, E & W

At

At *Falmouth, Foy, Fourn, Plimouth*, and *Dartmouth*, *W* by *S*
Briſtol and *Foulneſs*, *E* by *S*
At the *Smart*, *E* by *S*
Mouſhole, *W S W*
St *Davids Head*, *E* & *W*
Milford Haven, *E S E*
Iſle of *Man* and *Catnes*, *S E*
Three Leagues off the ſhore, at the *Lizard* to the Shore, to the *Lands end*, *E S E*
Within *Torbay*, and in the Bay of *Carnarven*, *W* by *S*
At the Mouth of *Severn*, *W* by *S*
At the *Moonles*, *W* by *S*
From the *Lizard* to the *Sorlings*, *W* by *S*
Before *Silly* in the Channel, *E* & *W*
At *Silly* half-Tide, *S S W*
Within *Mounts* Bay, and in the Sea of *Wales* & *Severn*, *W S W*
At *Lundy*, and the *Holmes* of *Briſtow*, *E* & *W*
In the *Sleeve* between *Silly* and *Uſhant*, *S* & *N*

Note, That the Flood ſets not in at the Eaſt end of the *Weight*, till a South-Eaſt Moon in that Road of *Dungeneſs*, South South-Eaſt; But without in the Channel a South-Weſt Moon makes full Sea: From the *Seams* and in the broad Sound between it and *Uſhant*, the Flood runneth Eaſt North-Eaſt, and Weſt South-Weſt.

Ireland.

AT *Caldy*. *W* by *S*
Waterford and *Abermorick*, *E* & *W*
At *Cape-Cleer*, *E S E*
Machnels Caſtle, *S E* by *E*
Dublin and *Lambay*, *S E* by *E*
Dunbar and *Kildnie*, *S E*
Dungarum and *Kinſale*, *Cork Haven* and *Baltamore*, *W S W*

The

The Course of all the Coasts of Holland, Zealand, France, *and* Spain, *upon what Point, and what distance they are.*

From the Isle of *Texel* unto *Egmont*, S and by W Leagues 5
From *Egmont* unto the *Maze*, S S W l. 11
From the *Maze* unto the *Wieling*, S W l. 12
From the *Wieling* unto the Head or Straight between *Dover* and *Calice*, W S W l. 18
From the Isle of *Walkeren* or *Flushing* unto *Calice*, S W and by W l. 22
From *Blackness* unto *Deep*, S S W l. 12
From *Deep* unto *Seyn-head*, or the River of *Seyn*, W S W l. 11
From the *Seyn-head* unto the River of *Cans*, S W l. 8
From thence unto Cape *de la Hague*, N W l. 12
From thence unto the *Caskets*, W and by N l. 18
From the *Caskets* to *Garnsey*, S W and by W l. 4
From *Garnsey* to St. *Malo*, S E l. 10
From *Garnsey* to the *Sept* Isles, S W and by S l. 10
From the Seven Isles to St. *Powl*, W S W l. 8
From thence to the *Fourn*, S W and by S l. 34
From the *Fourn* to St. *Matthew's* Point, S S E l. 3
From thence to *Fountenau* or *Founteyns*, S and by E l 5
From *Ushant* to the *Seams* a Sea-board it, S l. 7
From *Fountenau* to the West *Penmarques*, S E l. 7
From thence to the Isle of *Croy*, E and by S l. 12
From the West *Penmarques* to *Bell-Isle*, E S E l. 15
From thence to *Heys* somewhat more Easterly, S E l. 12
From thence again until within *Piquilier*, E and S l. 10
From thence again unto *Croysil*, E and by S l. 9
From *Piquilier* unto *Heys*, S and by W l 5
From *Heys* to the *Killiats*, E S E l. 10
From the Isle of *Heys* to *Porthuis*, S E and by E l. 12

From

From St. *Martins* Island to the *burning Isle*,	*S* & by *E* l. 3
From the *burning Isle* to the *Oyster Bank*,	*S S E* l. 3
From St. *Martins Isle* to the Tower of *Cordam*,	*S* & by *E* l. 12
From thence unto *Bayone*,	*S* & *N* l. 28
From *Bayone* to *Orio*,	*W S W* l. 5
From *Orio* unto St. *John de Luz*,	*E S E* l. 6
From *Cape de Pennas* to *Ribadeo*,	*S W* & by *W* l. 12
From *Orio* unto St. *Andrew*,	*W* & by *S* l. 10
From St. *Andrew* unto *Cape de Pennas*,	*E* & *W* l. 30
From *Cape de Pennas* to *Ortugal*,	*W* & by *W* l. 20
From *Ortugal* to *Ribadeo*,	*E* l. 14
From *Ortugal* unto the Isle *Cizarga*,	*S* & by *W* l. 13
From *Cizarga* to *Coronna*,	*E S E* l. 6
From thence unto *Cape Coriana*,	*W S W* l. 10
From *Coriana* to *Cape Finisterre*,	*S* & *N* l. 3
From *Finisterre* unto *Bayone*,	*S E* & by *S* l. 14
From *Bayone* unto *Port de Port*,	*S S E* l. 18
From *Port de Port* unto *Aviero*,	*S* & *N* l. 8
From *Aviero* to *Montega*,	*S S W* l. 5
From *Montega* unto the *Barlins*,	*S W* l. 12
From the *Barlings* unto *Roxende*,	*S* & by *E* l. 12
From *Roxende* unto St. *Uves point*,	*S E* & by *S* l. 8
From thence unto the *Cape* of St. *Vincent*,	*S* & *N* l. 20
From thence unto *Pharo*,	*E* & *W* l. 14
From *Pharo* unto *Lepe*,	*N E* & by *E* l. 12
From *Pharo* to *Saltees*,	*E N E* l. 18
From *Saltees* to *Chipiona*,	*S E* l. 8
From *Chipiona* to *Callis Malis*,	*S E* l. 6
From *Callis* unto the straight of *Gibralter*,	*S E* l. 8
From *Callis* unto Cape *de Cuntin*,	*S W* & by *S* l. 60
From Cape de *Cantin* to the Isle of *Madera*,	*W* l. 104
From St. *Vincent* to *Madera*,	*S W* & by *W* l. 115
From *Roxende* to *Madera*,	*S W* l. 130
From *Roxende* to the Isle of *Tercera*,	*W* l. 210

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The Courses of England, Ireland, *and* Scotland.

FRom *Becknes* unto the *Leith* in *Scotland*, *S S W* l. 28
From *Leith* unto *Barwick*, *S S E* l. 8
From *Barwick* unto the *Holy Isle*, *E S E* l. 4
From St. *Abbes-head* unto the Eastern end of *Farn Isle*, *S E* l. 6
From the Isles of *Farn* to the *Tees mouth*, *S S E* l. 16
From the River of *Tees* to *Flambrough-head*, *S E* & by *E* l. 14
From *Flambrough-head* unto *Blackney*, *S E* l. 18
From *Blackney* to *Winterton*, *S E*. l. 8
From *Winterton* to *Leistoff*, *S* & by *E* l. 8
From *Leistoff* to *Orford-haven*, *S* l. 7
From *Orford* to the *Foreland*, *S S E* l. 13
From the *Foreland* to *Dover*, *S* l. 5
From *Dover* to the *Shingles* or the *Ness point*, *S W* & by *W* l. 7
From the *Ness point* to the *Beach*, *W S W* l. 6
From the *Beach* to the Isle of *Wight*, *W* & by *S* l. 15
From *Wight* unto *Portland*, *W* & by *S* l. 10
From *Portland* to the *Start point*, *S W* l. 14
From the *Start* unto *Ram-head point*, *W N W* l. 6
From *Ram-head* unto the *Dodmans point*, *W S W* l. 8
From *Dodmans* to the *Lizard point*, *S W* & by *W* l. 6
From the *Lizard* unto the Isles of *Silly*, *W* l. 12
From the *Lizard* to the *Lands end*, *W N W* l. 8
From the *Lands end* to the Isle of *Lundy*, *N E* l. 14
From thence to the *Holms* of *Bristol*, *N E* & by *E* l. 16
From thence to the Isles of *Caldy*, *W S W* l. 25
From thence unto the Isles of *Salteys* on the Coasts of *Ireland*, *W N W* l. 20
From *Salteys* to *Cape-Cleer*, *W S W* l. 20
From *Cape-Cleer* to the Isle of *Dorsey*, *W* l. 12
From the Point of *Dorsey* to the Isle of *Blakem*, *N N W* l. 16
Brom *Blakem* to the Isles of *Arran*, *N N E* l. 14
From the Isles of *Arran* to *Galwick*, or the *Gulf* in *Ireland*, *E N E* l. 6

Of

Of divers and ſundry courſes over the Weſtern Sea.

FRom the *Texel* on the Coaſt of *Holland* to *Flambrough*, *W N W* l. 45
From *Texel* to *Winceton* in *Norfolk*, *W* l. 32
From the Iſle of *Texel* to *Leiſtoff*, *W* & by *S* l. 28
From the River of the *Maez* in South *Holland* to *Harwich*, *W* l. 26
From the ſaid *Maez* to the *Foreland* of *England*, *W* & by *S* l. 25
From the *Marſdeep* in North *Holland* to the ſaid *Foreland*, *S W* l. 36
From the ſaid *Marſdeep* to *Callice*, *W* and by *S* l. 38
From *Dover* to *Bulloign*, *S E* l. 8
From *Bulloign* to the *Beach*, *W* l. 16
From the *Beach* to *Deep* in *Normandy*, *S E* l. 18
From *Deep* to the Iſle of *Wight*, *E S E* l. 28
From *Wight* to the *Seyn-head* or *Mouth*, *S E* l. 20
From the ſaid River of *Seyn* to *Fortland*, *W N W* l. 30
From the Iſle of *Wight* to the *Caskets*, *S W* & by *S* l. 14
From *Garnſey* to St. *Malo* in *Normandy*, *S S E* l. 8
From the *Caskets* to *Portland*, *N* & by *W* l. 10
From the *Caskets* to the *Start Point*, *W N W* l. 16
From the *Start* to the *Sept. Iſles* in *Normandy*, *S S E* l. 24
From the *Start* to St. *Poul* in *Normandy*, *S* & by *W* l. 22
From St. *Poul* to *Portland*, *N E* & by *N* l. 32
From the *Fournes* to *Ramhead*, *N N E* l. 28
From the *Start Point* to *Uſhant*, *S W* & by *S* l. 32
From the *Fournes* to the *Lizard*, *S* & *N* l. 22
From *Uſhant* to the Iſles of *Silley*, *N N W* l. 26
From the *Sorlings* to *Milford-Haven*, *N* & by *E* l. 25
From the *Sorlings* to *Wexford* in *Ireland*, *N N W* l. 34
From the *Sorlings* to *Cape-Cleer*, *N W* l. 42
From *Cape-Cleer* to *Cape-Finiſterre*, *S* & *N* l. 130
From the *Lizard* to the *Cape de Finiſterre*, in *Galicia*, *S S W* l. 112
From *Uſhant* to the Iſle of *Cizarga* in *Galicia*, *S S W* l. 85
From *Uſhant* to *Laredo* in *Biskey*, *S S E* l. 85
From the *Seam* Rocks to St. *Sebaſtian* in *Biskey*, *S E* & by *S* l. 10

From *Ushant* again to Cape *de Pennas* in *Biskey*, S & N l. 70
From *Belisle* to *Ortugal* in *Galicia*, S W l. 75
From St. *Martin's Isle* to *Ortugal*, W S W l. 24
From *Ortugal* to Cape *de Corina*, S W & by W l. 24
From *Cape de Finisterre* to the Isle of St. *Michael*, W S W l. 190
From *Madera* to the great Isle of *Canary*, S E & by E l. 60
From *Cape de Finisterre* to *Bayone* in *Galicia*, S & by E l. 15
From *Cape de Finisterre* to the Isle of *Barlings*, S & N l. 50
From the *Barlings* in *Portugal* to the Isle of *Canary*, S S W l. 170
From the Isle of *Madera* to *Callis Malis*, E N E l. 150
From *Callis* to *Cape de Cantin*, S W & by S l. 65
From *Cape de* St. *Vincent* unto *Cape de Cantin*, S & N l. 62
From *Cape de* St. *Vincent* unto the Isle of *Madera*, S W & by W l. 120
From *Roxend* in *Portugal*, to the Isle of *Tercera*, E & W l. 210

The Courses of Norway, Swedeland, *and* East-Finland.

FRom *Schuytenis* to the *Vesteen*, S & by E l. 4
From *Vesteen* to *Westone* to the *Jeddor*, S S E l. 4
From the *Jeddor* to the *Vorsteen* or *Forstone*, S E l. 5
From the *Forstone* to the *Noes*, E S E l. 6
From the *Noes* to *Reperwick*, E N E l. 8
From *Reperwick* to *Mardon*, N E l. 10
From *Mardon* to *Jofferland*, N E l. 8
From *Jofferland* to *Langhesond*, N N E l. 1
From *Langhesond* to *Ferderoer*, N E & by E l. 6
From *Ferderoer* to *Soen Water*, N l. 6
From *Ferderoer* to *Roeghe*, N N E l. 4
From *Ferderoer* to *Akersound*, E N E l. 6
From *Akersound* to *Maesterland*, S E & by E l. 4
From *Paternoster* to *Nydrink*, S E l. 8
From *Nydrink* to *Waesbergh*, S E & by E l. 4
From *Waesberg* to *Swederoer*, S S E l. 6

From

From *Swederoer* to *Col*,	*S S W* l. 3
From *Col* to *Lapſand*,	*S E* l. 3
From *Lapſand* to *Ween*,	*S S E* l. 2
From *Ween* to *Darkeriff*,	*S* & by *E* l. 7
From *Darkeriff* to *Steeden*	*S* & by *W* l. 4
From *Steeden* to the North-end of *Barnholm*,	*E* & by *N* l. 15
From *Barnholm* to *Anno*,	*N* & by *W* l. 8
From *Anno* to the *Rocks*,	*N E* l. 8
From the *Rocks* until within the *Calmorſond*,	*N N E* l. 10
From *Calmorſond* to the *Swediſh ſonck frow*,	*N N E* l. 8
From *ſonck frow* to *Landſoort*,	*N N E* l. 8
From thence until before *Dury Haven*,	*N E* & by *E* l. 8
From the *Stockholms*, *Shares*, to *View* of *Abo*,	*N E* & by *N* l. 24
From *View* unto *Luns Utſchares*,	*E N E* l. 28
From *Utſchares* to the Iſle of *Putſuagto*,	*E* & by *N* l. 30
From thence unto *Somere*,	*E* & *W* l. 9
From *Somere* to the *Redhole* of *Wiburg*,	*N E* l. 9
From the *Redhole* to *Traleſand*,	*N E* & by *N* l. 12
From thence to *Wiburg*,	l. 2

THere is a new Book, called the Pilots Sea-Mirrour, *which is a* Compendium *of the largeſt* Wagoner, *or the lightning* Sea Columb *containing all diſtances or Thwart Courſes of the* Eaſtern, Northern, *and* Weſtern *Navigation, with a general* Tide-Table, *for every day of the New and the Full of the Moon exactly, for Eight years; alſo Courſes and Diſtances throughout the* Straights. *Sold by* Eliz. Hurlock *at the ſign of the Roſe at the Weſt-end of* Pauls *Church.*

The Depth and Soundings near divers Provinces And firſt of Gaſcoin, Poictu, *and* Britain.

VVIthout the River of *Burdeaux* there is 14 Fathom depth, but when you come within the ſight of *Cordam* Tower 30 Fathom.

Over againſt the Coaſts of *Poictu*, 16 Leagues without *Oleron* you have 35 Fathom, but coming near the Land 8 Leagues from the Shore, you have 35 Fathom: In the Channel between *Porthuis* and *Heys*, it is 30 Fathom, and as much in the Channel of *Heys*, as alſo between *Heys* and *Belile*, without the Channel is 35 Fathom, but within 25: without *Heys* two Kennings off, there is found 45 Fathom.

Twenty two Leagues Southward off *Belile* is 70 Fathom, but 9 Leagues from the North-weſt Point of that Iſland, towards the South-weſt is 60 Fathom: and over againſt the midſt of *Belile* in 40 Fathom depth, you ſhall ſee Land. In your Courſe between *Belile* and the *Seams*, you ſhall come no nearer than 50 or 45 Fathom, if you Sail from *Belile* Weſt and by North: when you are againſt *Gloyland*, you ſhall find 60 Fathom depth without, and within the Rock which ſtands off *Gloyland* to the Sea-wards, you have 40 Fathom water: in 60 Fathom depth without the Weſt *Penmarks*, you may Sail North-weſt by Weſt without the *Seams*, but by Night come no nearer than in 55 Fathom, for the Ground is groſs and red Sand, and full of red Flints: half a League Weſt South-weſt of the *Seams* is a ledge of Rocks, where you have 7 Fathom depth, but between the *Seams* and the Rock is 50 Fathom.

In the Channel between the *Seams* and *Uſhant* is 55 Fathom depth, the Ground is groſs and red Sand, with little round Stones red and black: near to *Uſhant* is 45 Fathom, but within it is of a variable depth: South-weſt almoſt 6 Leagues off *Uſhant*, you have 70 Fathom, and the Ground is fine white Sand, with little white Shells, and other ſmall things like Needles, and then is *Uſhant* Eaſt from you: but if the Land be groſs, and white, mingled with great and white Shells, then it is South-Eaſt to you: but if you doubt

doubt of theſe Grounds, go Northerly if your Sound be deeper, then are you towards the *Seams*, but if not ſo deep, then are you in the Channel almoſt North of *Uſhant*.

Between *Uſhant* and *Obverack*, in the Trade, it is 60 Fathom depth, between *Uſhant* and the *Sorlings* in the midſt of the Channel there is 70 Fathom, between the *Seams* and *Uſhant*, in 70 Fathom water, the Ground is of Little black Stones eaſie to be broken, and of yellow Earth and Clay; but if you find red and hard Sand, go Northward, till you happen on white Sand mingled with long ſtrokes, and then you are in the Channel.

If from *Cizarga* you Sail North North-Eaſt in the *Spaniſh* Seas towards *Uſhant*, and find your ſelf in 80 Fathom, you are 14 or 15 Leagues off *Uſhant*; but coming nearer you ſhall have 70 Fathom water, and be 10 Leagues from *Uſhant*; but if you find the ground to be yellow ſhells, and little black Stones, then are you towards the *Seams*, therefore you muſt with the Tide bear off Northward; to ſhun *Uſhant* until you find white Sand, and things like Needles, for ſuch are the Grounds of the Channel.

Betwixt *Uſhant* and the Iſle of *Baſe*, when you ſail at 4 Fathom water, you are 4 Leagues off the ſhore, but by Night come no nearer than 25 Fathom. When you are 2 Leagues off *Obverack*, you ſhall find 25 Fathom depth, but 8 Leagues off the *Sept* Iſles you have 55 Fathom.

A League without the Rocks of *Obverack*, there is a blind or hidden Rock: ſo that if you were to Sail upon a Boord between the *Fourns* and *Obverack*, come no nearer the blind Rock than 40 Fathom, but Eaſtward you may Sail in 30 or 25 Fathom.

If a Ship Sailing Weſt South-Weſt, and South-Weſt and by Weſt off *Silly* at 80 Fathom water, be found to be under 49 Degrees 15 Minutes of Altitude, ſhe is 26 Leagues from Land, and muſt go Eaſt and by North, until ſhe get 66 Fathom Water, for then ſhe is in the Channel between *Silly* and *Uſhant*; and then if ſhe be bound for *England*, ſhe muſt Sail more Northward, and between the Lands end and the *Lizard* ſhe ſhall have 55 Fathom depth.

The Soundings and Grounds between Ireland, England, *and* Normandy.

THree Leagues without the Iſles of *Dorſey* near *Ireland*, it is 45 Fathom deep: In the Channel between *Dorſey* and *Cape-Cleer*, is 42 or 43 Fathom, the Channel from *Cape-Cleer* to *Saltees*, hath 45 Fathom, but 2 Leagues off *Ireland*, it hath but Forty; between *Saltees* and *Milford* it is 44 Fathom deep, and between *Lundy* and *Silly* is 38 Fathom: In the Mid way between *Silly* and *Milford* is 44 Fathom, but North of *Silly* 40 and 42, and near *England*, by the Lands-end, the Channel is of 50 Fathom deep.

Coming from *Cape Finiſterre*, Sailing North North-Eaſt, if you have 80 Fathom you are 20 Leagues off the Shore, and the Ground is ſmall black Stones with great red Sand: In the ſame Courſe, when you have but 60 Fathom, you are within 12 or 14 Leagues of the Shore, but ſhall not ſo ſoon ken Land as you think for: you ſhall a great while have 60 Fathom, being at the North parts of the Channel about *Silly*: Between *Uſhant* and *Silly*, the Channel is 70 Fathom, on the South ſide of *Silly* the Ground is ſmall red Stones, and fine white Sand: Over againſt the *Lizard* and *Falmouth* four Leagues from the Shore is 52 Fathom: betwixt *Foy* and *Plimouth* Sound, in the Channel nigheſt is 60 Fathom; between the *Lizard* and the *Start*, bear no nearer the Shore than 35 Fathom; you may caſt Anchor in the Trade or Channel in 25 Fathom, and ſo you ſhall lie within the *Foreland* Stream; between *Plimouth* and the *Sept* Iſles, in the midſt of the Channel 55 Fathom, but four Leagues South South-Weſt off *Plimouth*, is but 35 Fathom; South South-Eaſt off the Mid-land of the *Start* is 45 Fathom; but from thence 5 or 6 Leagues South-Eaſt is 54 Fathom: in the Channel between the *Caskets* and *Portland* is 40 Fathom: And a League North off the Iſle of *Aldernay*, is a hole or Pit 80 Fathom deep, all the reſt of the Channel between *Portland* and *Aldernay* is of equal depth, *viz.* 40 Fathom: When you are within kenning of *Portland* your Soundings is 34 Fathom: and 2 Leagues off *Weight* 36 Fathom: alſo 2 Leagues Eaſtward of *Beechy*, between *Picardy* and

Weight

Wight, the Channel in the midſt is 38 Fathom: Betweem *Winchelſey* and *Picardy* is 24 Fathom, the Shoalds between the heads called the *Urwenſand*, hath but 3 Fathom and an half; but on the South-ſide of it is 24 Fathom; and in all the fair way between *Zealand* and *Dover*, it is 24 Fathom deep.

Depth of the North Sea from the Foreland.

IN the Channel from *England*, *Foreland*, and the Sands of *Flanders*, you have 24 Fathom deep, but 3 Leagues North-Weſt by Weſt, off the County of *Zierrickze*, called *Tolreck*, it hath but 4 Fathom deep without the Shoald, the Channel of *Zealand* is 26 Fathom North-Weſt off *Harlem* 8 or 9 Miles within the Sea, there beginneth a Shelf called *De Breede Verthien*, reaching along the Coaſt of *Holland*, to the plain of *Ameland*, where it endeth; Over againſt *Harlem* and *Egmont* is 13, 14, or 15 Fathom, and the Ground is full of Oaſe, mingled with black Sand like Muſtard-Seed: The ſaid Shelf hath 15, or 17 Fathom depth: Between *Texel* and *Vlyland*, where the Ground is groſs red Sand, 6 or 7 Leagues from the Shore, ſo there the Shoald is narrower, than it is toward the South-end of the Channel: Without the Shoald between *Zealand* and *Texel* is 26 Fathom deep, as far as the Shoald which the Fiſhers call *Dog-ſand*. In the Channel on *England* ſide over againſt *Yarmouth* is 35 Fathom, but againſt *Flambrough* and *Scarbrough* Point 38 Fathom, whereas the white Shelf called *Dog-ſand* beginneth, reaching into the North Seas to the Channel of *Helichland*; this Shoald (where it is within kenning of *Flambrough* Point,) hath but 9 or 10 Fathom; but when in the ſame Sand you find 12 Fathom, then the *Texel* is from you South-Eaſt almoſt 30 Leagues; but when you come to 16 Fathom, then are you within 21 Leagues South South-Eaſt of *Vlyland*.

A Ship that comes from the *Riff*, finding 18 Fathom depth, on the aforeſaid Sand, is then 20 Leagues South and by Eaſt of *Vlyland*, but at 22 Fathom you muſt then Sail towards the *Vlye*, South and by Weſt, and South South-Weſt; but if in this Channel of *Helichland*, 14 or 16 Fathom be found, then you muſt Sail South-Weſt, and South-Weſt by South, and then you come to the *Schelingh*,

lingh; but if in *Hellichland* Sound, you have 27 Fathom, then are you altogether to the Eastward of it: between the *Riff* and the *Dogger-sand*, the Channel is 26 Fathom, without the Channel Westward, it is 32 Fathom deep.

A Ship that comes out of the *English Straits*, or out of *Zealand*, having at the *Riff* 24 Fathom, is from the *Naes* in *Norway*, 18 Leagues North and by East; but having 20 Fathom, is but 16 Leagues from it North; and finding but 18 Fathom, is then 18 Leagues off it North and by West: the Course from thence to the *Holmes* is 12 Leagues North and by East; from thence to the Point of *Schagens*, is 18 Leagues North-East by East: There is a Rock of 1 Fathom depth North-East, and North-East by East off the *Holmes* two Leagues from Shore.

Depth near Jutland *and* Ameland.

IN the Sea without *Jutland*, a Mile from *Dodenberg*, is a Bank called *Rief-horn*, stretching out 8 Leagues West and by South, in some places but 3 Fathom deep, and in some places may be Sailed over, and become a Road for a North-West, and a North-wind in 20 Fathom; From *Ameland* towards the Sea, the Ground is gross Sand, red and black mingled with Shells, thence Southward in 16 Fathom; Sailing 3 Hours, you shall come to the smooth Sea of *Ameland*, where the Ground is fine Sand with Shells: North from *Schelingh* in 24 Fathom is fine white Sand, and in 8 Fathom white and black Sand mingled; *Vlyland* hath white Sand with Shells and thin black Sand in 16 Fathom depth: from the West end of *Vlyland* is great red Sand mingled with black like unto Mustard-seed: about 6 or 7 Leagues from Shore at the East-end of *Schelingh*, to Sea-wards, at 18 Fathom is fine white Sand, mingled with black, having in it things like Needles. Over against *Bork* in the Western *Emes* at 17 or 18 Fathom deep, Land may be seen; the Ground gross gravelly Sand. At 14 Fathom may *Ameland* be kenn'd, but *Schelingh* at 16, and *Vlyland* at 15 or 16 Fathom water At the North *Hock* or *Texel*, Land may be seen at 16 Fathom, *Holland* at 14 or 15. When you Sail within the Shoald called the *Bredairthein*, which beginneth North-west of *Harlem*, and stretched along the Coast of *Holland*, to the West-end of *Vlyland*, it is 7 or 8 Leagues from the Shore.

Soundings

Soundings and Grounds near the Schaw.

A Great League Weſt and by North from the *Schaw* is 35 Fathom deep: North North-Eaſt a great League off the corner of this Point is 38 Fathom, and when the Point is North-Eaſt from you, then you have 17 Fathom. Between this Point and *Leſon*, the Channel is 20 Fathom deep, and the Ground like Clay or Dirt; between *Anhout* and *Waersberg*, in the midſt of the Channel is 22 Fathom water: Between *Leſon* and *Anhout*, the Ground is fine and ſtony; near *Waersberg* to a Shoald of 17 Fathom deep: Between *Anhout* and *Coll* is another Shoald of 17 Fathom, where ſometimes it is troubleſome like a Whirlpool.

Depths of the Eaſtern Seas.

BEtween *Oeland* and *Gothland*, the Soundings are unequal; ſometimes of 20, ſometimes of 23 Fathom, the Ground groſs, and black ſtony Sand like Peaſe: When the South end of *Oeland* is 2 Leagues from you Weſt-wards, you have 27 Fathom, where alſo you may Gage water, but when the Chappel of *Sudernoorden* beareth Weſt North-Weſt of you, then have you 31 Fathom, and ground fit to Gage water. Over againſt the Rock in the Fair way is 52 Fathom, and a Clay Ground, but fit for Gaging: between the greater and leſſer *Carta* is 14 Fathom, under which is a ſafe Road for Ships; there is a Shoald between *Houghbergh* and *Oſtergard* 24 Fathom depth, the Ground great Sand, but hardly from thence can you ken *Gothland* out of the Top: there is alſo to the Eaſtward another Shoald of 36 Fathom, which when you are paſt, you have more than 40 Fathom water: When the Point of *Right* is 3 Leagues South-Eaſt from you, then have you 30 Fathom; but when it is from you half a League South South-Eaſt, you have but 15 Fathom, and the Ground is white Sand; but when it beareth Weſt a ſmall League from you, then you ſhall find 16 Fathom: Over againſt *Heel*, half a League from the Shore, it is almoſt 3 Fathom deep: the Road for Ships at *Heel* hath 25 Fathom depth: Between *Moan* and *Falſtenbourn* is 14 Fathom depth: Between *Stead* and *Falſtenbourn* in the very Channel, is but 12 Fathom deep: Near *Falſtenbourn* it

is full of Shoalds; but near *Stead* you have 13 Fathom water: between *Dark-riff* and *Southiomen*, which is more Shoaldy, there is 5 Fathom wanting two Foot, from thence toward the *Sound* it is ſomething deeper than 6, 7, 8, 9, or 10 Fathom.

A Note of certain and moſt dangerous places in the Sea.

THe principalleſt and moſt perillous of all is the *Mael-ſtream* Well or *Slorp*, called the *Monsk-Stream*: Which lieth on the back ſide of *Norway* in 68 Degrees, on the North ſide of an Iſland or Rock called *Weeray*. This Well draweth the water unto it ſelf, during the whole Flood, (which is the ſpace of 6 Hours 12 Minutes) with ſuch an in-draught and force, and with ſuch a noiſe, through the tumbling and falling of the Waves and Streams one upon the other, that it is rather to wonder at, than to write of. So that during that time, within the ſpace of more than 2 Leagues round about the Rock of *Monsk* (under which that water floweth) no Ship or other Veſſel may come near, for they ſhould to their utter deſtruction be drawn into it, and ſwallowed up; but all the time of the Ebb the water is ſo ſtrongly caſt up again, that no kind of Subſtance or Metal, how heavy ſoever it be, can there ſink: So that our Northern Fiſhers at that time with their Jollen or Fiſhing Boats take many and ſtrange formed Fiſhes, which they draw into their Boats with Hooks and Lines, which they have ready laid for that Purpoſe: For that during the Ebb, they cannot return into the Gulph, nor get under water by any means.

The Northern People that Inhabit about thoſe Rocks, do think that Stream paſſeth away underneath a part of *Norway*, under the North bottom in Eaſt *Finland*, becauſe that in that place there is likewiſe ſuch a *Mael-ſtream*, though not altogether ſo ſtrong nor dangerous) where the like Fiſhes are taken, and the water is in like ſort troubleſome, as it is underneath and above the Rock of *Monsk*.

Whereupon many experienced Pilots do call the ſaid *Slorp*, *The Navel of the Sea*, which cauſes the Courſes of the Ebbs and Floods

abou-

about all the Lands that are on the North ſide of the Equinoctials as the moſt convenient place for that pupoſe, to ſpread the waters South, North, Eaſt and Weſt; that is to ſay, Northerly, toward the Pole Artick, South Eaſterly on the back ſide of *Ruſſia* and *Tartaria*, and towards the Straight of the great South Sea called *Mar del Zur*, wherein the Spirits of Iſlands (called *Mollucca*'s near the Equinoctial are lying Southward, the North-Sea of theſe low Countries: As alſo on the back ſide of *Scotland* and *Ireland*, towards the *Spaniſh* and *Atlantick* Seas, and towards the North-weſt beyond *Iſeland*, towards *Frobiſhers Straights*, where it is thought the way unto *Catay* may be found.

There are moreover to be feared in the Weſtern Seas, very dangerous Streams and Gulphs, as in the Race of *Portland*, where oftentimes happeneth ſuch turning and tumbling of Waves and Streams, that the Ships which paſs that way are many times in great peril.

Moreover, the Race, of *Branquert*, between *Normandy* and the Iſles of *Alderney*, roareth and rageth, and ſo dangerouſly, that many Ships fall therein head-long, ſo deep, that ſuddenly they are ſwallowed up, and ſunk to the very bottom.

The Race of *Fountney* is more dangerous than all theſe, wherein many ſmall Veſſels and Barques of *Britany*, and of other Countries, are ſuddenly devoured and caſt away: And the entrance of the *Garrone*, called the River of *Burdeaux*, between the Towers of *Cordam*, and the Southern and Northern *Aſſes*, is likewiſe very perillous, and many Ships do often periſh there, if the Pilots be not skilful, and well acquainted with the place.

And therefore being the moſt full of danger, it behoveth each Pilot, or Maſter to have eſpecial knowledg thereof, and great care to prevent the danger that may enſue unto them thereby.

The Four Terms.

Hillary Term begins *January* 23, and ends *February* 12.

Easter Term begins 17 days after *Easter-day*, and ends the Monday before *Whitsunday*.

Trinity Term begins next Friday after *Trinity* Sunday, and ends on *Wednesday* 19 days after.

Michaelmas Term begins the 23 of *October*, and ends *November* 28.

A Brief Explication of the several parts of this following Kalender or Ephemerides.

THe first Page contains an *Almanack* for 18 years to come, shewing the Prime, Epact, Sunday Letter, Leap-year, and all the Principal movable Feasts.

The following Leaves shew the 12 Months of the Year in their order, and each Month is divided into several Columns or Spaces, which are alike in all the Months.

In the first is set down the Prime.

In the second, is set down the Hour and Minute of the New Moon, for 19 Years following.

In the third, the Day of the Month.

In the fourth, the Sunday-Letter, whereby you may know the Day of the Week.

In the fifth, i set down the Names of the fixed Feasts, and other Days of Note, and in the void place between them is set down the time of the Sun rising and setting at *London*.

Then followeth four Sections, each one consisting of 3 Columns, where is set down the Longitude and Declination of the Sun in the Meridian of *London*, for the years 1668, 1669, 1670, 1671.

Unto this *Kalender* is added the *Gregorian* or Forreign Account for every Month.

Hereafter

Hereafter followeth a most excellent, necessary, and compendious Kalender, shewing the Prime, Epact, Dominical-Letter, Leap-years *and* Movable Feasts *for* 24 *Years, inclusively comprehending therewith the true* Day *and* Hour *of the Moons* Conjunction *or* Change *for* 18 *Years to come, with the true place of the* Sun, *and his* Declination *from the* Equinoctial, *both Northwards and Southwards upon every* Degree *thereof through the Twelve Months of the Year.*

	The English Account.						Forreign Account.				
Years of our Lord.	Prime.	Epact.	Letter.	Sunday Letter.	First Sunday in Lent.	Easter Day.	Whit-Sunday.	Easter Day.	Whit-Sunday.	Letter.	Sunday Letter.
1665	13	23	*A*		Feb. 12	Mar. 26	May 14	Apr. 5	May 24	*D*	
1666	14	4	*G*		Mar. 4	Apr. 15	June 3	25	June 13	*C*	
1667	15	15	*F*		Feb. 24	Apr. 7	May 26	10	May 29	*B*	
1668	16	26	*E*	*D*	c	Mar 22	10	1	May 20	*A*	*G*
1669	17	7			28	Apr. 11	30	21	June 9	*F*	
1670	18	18	*B*		20	3	22	6	May 25	*E*	
1671	19	29	*A*		Mar. 12	23	June 11	Mar. 29	May 17	*D*	
1672	1	11	*G*	*F*	Feb. 25	7	May 26	Apr. 17	June 5	*C*	*B*
1673	2	22	*E*		17	Mar. 30	May 19	Apr. 2	May 21	*A*	
1674	3	3	*D*		Mar. 8	Apr. 19	June 7	22	June 10	*G*	
1675	4	14	*C*		Feb. 21	4	May 23	14	2	*F*	
1676	5	25	*B*	*A*	13	Mar 26	14	5	May 24	*E*	*D*
1677	6	6	*G*		Mar. 4	Apr. 15	June 3	Apr. 18	June 6	*C*	
1678	7	17	*E*		Feb. 17	Mar. 31	May 19	10	May 29	*B*	
1679	8	28	*E*		Mar. 9	Apr. 20	June 8	Mar. 26	May 14	*A*	
1680	9	9	*D*	*C*	Feb. 28	11	May 30	Apr. 21	June 9	*G*	*F*
1681	10	20	*B*		Feb. 20	3	22	Apr. 30	May 25	*E*	
1682	11	1	*A*		Mar. 5	10	June 4	Mar. 22	May 10	*D*	
1683	12	12	*G*		Feb. 25	8	May 27	Apr. 18	June 6	*C*	
1684	13	23	*F*	*E*	Feb. 16	Mar. 30	18	2	May 21	*B*	*A*
1685	14	4	*D*		Mar. 8	Apr. 19	June 7	Apr. 22	June 10	*G*	
1686	15	15	*C*		Feb. 21	4	May 23	Apr. 14	June 2	*F*	
1687	6	26	*B*		Feb 11	Mar. 27	15	Mar. 30	May 18	*E*	
1688	17	7	*A*	*G*	Mar. 4	Apr. 15	June 3	Apr. 18	June 6	*D*	*C*

January hath XXXI. days.

The Prime.	The time of the New Moon. H. M	Month day.	Week day.	The English Kalender. Suns rising. H. M.	Suns setting. H. M.	First Year, ⊙ in Capricorn. 1659. Suns Long. D. M.	Suns Decli. D. M.	Diff. of Decli.	Second Year, ⊙ in Capricorn. 1670. Suns Long. D. M	Suns Decli D. M.
8	23 24	1	A	N. years day.		21 59	21 43	10	1 21 45	21 46
		2	B	7 59	4 1	2 23 1	21 33		2 22 46	21 36
16	12 6	3	C	7 58	4 2	3 24 2	21 25	11	3 23 47	21 26
5	8 14	4	D	7 57	4 3	4 25 3	21 12		4 24 48	21 15
13	20 56	5	E	7 56	4 4	5 26 4	20 01	12	5 25 50	21 04
		6	F	Twelfth day.		6 27 6	20 49		6 26 51	20 52
2	9 37	7	G	7 53	4 7	7 28 7	20 37	13	7 27 52	20 40
		8	A	Lucian	4 8	8 29 8	20 24		8 28 53	20 27
10	5 46	9	B	Sun in Aquar.		9 ♒ 9	20 14	13	9 29 54	20 14
18	18 27	10	C	7 49	4 11	10 1 10	19 58		10 ♒ 55	20 01
		11	D	7 48	4 12	11 2 11	19 31	14	11 1 57	19 48
7	14 36	12	E	7 46	4 14	12 3 12	19 16		12 2 58	19 34
		13	F	Hillary	16	13 4 14	19 01	15	13 3 59	19 19
15	3 17	14	G	7 43	4 17	14 5 15	19 46		14 5 0	19 05
4	15 58	15	A	7 41	4 19	15 6 16	18 31	15	15 6 1	18 50
		16	B	7 40	4 20	16 7 17	18 15		16 7 2	18 35
12	12 7	17	C	7 39	4 21	17 8 18	18 59	16	17 8 3	18 19
		18	D	7 37	4 23	18 9 19	17 43		18 9 4	18 03
1	0 48	19	E	7 35	4 25	19 10 20	17 26	17	19 10 5	17 47
9	0 0	20	F	Fabian	4 26	20 11 21	17 10		20 11 6	17 30
17	9 38	21	G	Agnes	4 28	21 12 21	16 52	18	21 12 7	17 14
		22	A	Vincen.	4 30	22 13 22	16 35		22 13 8	16 56
6	5 47	23	B	7 29	4 31	23 14 23	16 17	18	23 14 9	16 29
14	18 28	24	C	7 27	4 33	24 15 24	15 59		24 15 9	16 21
		25	D	Conver. Paul.		25 17 25	15 40	19	25 16 10	16 03
3	7 10	26	E	7 23	4 37	26 17 26	15 22		26 17 11	15 44
		27	F	7 22	4 38	27 18 26	15 03	19	27 18 12	15 26
11	3 18	28	G	7 20	4 40	28 19 27	15 43		28 19 13	14 07
19	16 0	29	A	7 18	4 40	29 20 28	14 24	19	29 20 13	14 48
		30	B	7 16	4 42	30 21 29	14 04		30 21 14	14 28
8	12 8	31	C	7 14	4 46	31 22 29	14	20	31 22 15	14 09

Third Year, ☉ in Capricorn.			Diff. of Decli.	Leap Year, ☉ in Capricorn.				THE Foreign Account. And The Southing of the Stars just at Midnight.
1671.	Suns Long. D M.	Suns Decli. D.M		1672.	Suns Long. D.M.	Suns Decli. D.M		
1	21 30	21 48	10	1	21 15	21 51	11 D	Each Star is set down just against the day when it comes to the South at Midnight; by which you may see what Stars are in Observation: and at what time of the night. For the Stars before, come to the South so much before midnight; and the Stars after, so much after midnight as they are distant in Days; allowing one Hour for 15 Days, and 2 Hours for a Month.
2	22 31	21 38		2	22 16	21 41	12 E	
3	23 33	21 28	10	3	23 17	21 31	13 F	
4	24 33	21 18		4	24 19	21 30	14 G	
5	25 35	21 07	12	5	25 21	21 09	15 A	
6	26 36	20 55		6	26 22	20 58	16 B	
7	27 37	20 43	12	7	27 23	20 46	17 C	
8	28 38	20 31		8	28 25	20 34	18 D	
9	29 39	20 18	13	9	29 26	20 21	19 E	
10	♒ 41	20 05		10	♒ 27	20 08	20 F	
11	1 42	19 51	14	11	1 28	19 55	21 G	
12	2 43	19 37		12	2 29	19 41	22 A	
13	3 44	19 23	14	13	3 30	19 27	23 B	
14	4 45	19 09		14	4 31	19 13	24 C	
15	5 46	18 54	15	15	5 32	18 58	25 D	Conversion of St. *Paul.*
16	6 47	18 39		16	6 33	18 42	26 E	
17	7 48	18 23	16	17	7 34	18 28	27 F	South arms of the (Crab, 13.8.N.
18	8 49	18 07		18	8 35	18 17	28 G	
19	9 50	17 51	16	19	9 36	17 55	29 A	
20	10 51	17 35		20	10 37	17 39	30 B	
21	11 52	17 18	17	21	11 38	17 22	31 C	
22	12 53	17 01		22	12 39	17 95	1 D	*FEBRUARY.*
23	13 54	16 43	18	23	13 39	16 47	2 E	Purification of *Mary.*
24	14 55	16 25		24	14 40	16 30	3 F	Hydra's Heart, 7.12.S.
25	15 56	16 07	18	25	15 41	16 17	4 G	
26	16 56	15 49		26	16 42	15 53	5 A	The Figures following each Star shews the Degrees and Minutes of Declination, N. North, S South.
27	17 57	15 31	19	27	17 42	15 35	6 B	
28	18 58	15 12		28	18 43	15 16	7 C	
29	19 59	14 43	20	29	19 44	14 57	8 D	
30	20 59	14 33		30	20 45	14 58	9 E	
31	21 00	14 14		31	21 45	14 19	10 F	

South Declination decreasing.

February hath XXVIII. days.

The Prime.	The time of the New Moon H.	M	Month day.	Week day.	The English Kalender. Suns rising H.	M	Suns setting. H.	M.	1669.	First Year, ⊙ in Aquarius. Suns Long. D.	M.	Suns Decli. D.	M.	Diff. of Decli.	1670	Second Year, ⊙ in Aquarius. Suns Long. D.	M.	Suns Decli. D	M.
			1	D	7	12	4	48	1	23	30	13	44	20	1	23	15	13	49
16	0	50	2	E	*Purif.*		*Mary.*		2	24	31	13	24		2	24	16	13	29
5	13	31	3	F	7	9	4	51	3	25	31	13	4	20	3	25	17	13	9
13	9	40	4	G	7	7	4	53	4	26	32	12	43		4	26	17	12	48
2	22	21	5	A	Agat.		4	55	5	27	32	12	22	21	5	27	18	12	27
			6	B	7	3	4	57	6	28	33	12	1		6	28	18	12	6
10	18	30	7	C	7	1	4	59	7	29	33	11	40	21	7	29	19	11	45
			8	D	Sun in Pisces.				8	♓	34	11	19		8	♓	19	11	27
18	7	12	9	E	6	57	5	3	9	1	34	10	57	22	9	1	19	11	2
			10	F	6	55	5	5	10	2	34	10	36		10	2	20	10	41
7	3	20	11	G	6	53	5	7	11	3	35	10	14	22	11	3	20	10	19
15	16	1	12	A	6	51	5	9	12	4	35	9	53		12	4	20	9	57
			13	B	6	49	5	11	13	5	35	9	30	23	13	5	21	9	35
4	4	42	14	C	Valentine.			12	14	6	36	9	7		14	6	21	9	13
			15	D	6	46	5	14	15	7	36	8	45	23	15	7	21	8	51
12	00	50	16	E	6	44	5	14	16	8	36	8	22		16	8	21	8	28
1	13	32	17	F	6	42	5	18	17	9	36	8	30	23	17	9	21	8	6
9	9	41	18	G	6	40	5	20	18	10	36	7	17		18	10	22	7	43
7	22	22	19	A	6	38	5	22	19	11	36	7	14	23	19	11	22	7	20
			20	B	6	36	5	24	20	12	36	6	51		20	12	22	6	57
6	18	31	21	C	6	34	5	26	21	13	36	6	28	23	21	13	22	6	54
			22	D	6	32	5	28	22	14	36	6	5		22	14	22	6	11
14	17	12	23	E	6	30	5	30	23	15	36	5	42	23	23	15	22	5	48
3	19	54	24	F	*Matthias.*				24	16	36	5	18		24	16	22	5	24
			25	G	6	26	5	34	25	17	36	4	55	23	25	17	21	5	1
11	16	2	26	A	6	24	5	36	26	18	36	4	32		26	18	21	4	38
			27	B	6	22	5	38	27	19	36	4	08	23	27	19	21	4	14
19	4	44	28	C	6	20	5	40	28	20	35	3	45		28	20	21	3	51

When it is Leap-Year, *February* hath 29 Days, and then St. *Matthias* is upon the 25 Day.

1671.	Third Year, ⊙ in Aquarius. Suns Long. D M.	Suns Decli. D. M	Diff. of Decli.	1670.	Leap Year, ⊙ in Aquarius. Suns Long. D. M.	Suns Decli. D. M.	South Declination.	THE Foreign Account. And The Southing of the Stars just at Midnight.
1	23 1	13 54	20	1	22 46	13 59	11	G
2	24 1	13 34		2	23 47	13 39	12	A
3	25 2	13 13	20	3	24 47	13 19	13	B Lions heart 13. 36. N.
4	26 2	12 53		4	25 48	12 58	14	C
5	27 3	12 33	21	5	26 48	12 38	15	D Lions neck 25. 5. N.
6	28 3	12 12		6	27 49	12 17	16	E
7	29 4	11 51	22	7	28 49	11 56	17	F
8	♓ 4	11 30		8	29 50	11 34	18	G
9	1 5	11 8	22	9	♓ 50	11 13	19	A
10	2 5	10 46		10	1 51	10 51	20	B
11	3 6	10 24	23	11	2 51	10 30	21	C
12	4 6	10 23		12	3 51	10 8	22	D
13	5 6	9 41	23	13	4 52	9 46	23	E
14	6 6	9 19		14	5 52	9 24	24	F *Matthias Apostle.*
15	7 7	8 56	23	15	6 52	9 1	25	G
16	8 7	8 33		16	7 52	8 39	26	A G. Bears side 58. 12. N.
17	9 7	8 11	23	17	8 52	8 17	27	B G. Bears back 63. 55.
18	10 7	7 48		18	9 53	7 54	28	C (N.
19	11 7	7 25	23	19	10 53	7 31	1	D *MARCH.*
20	12 7	7 3		20	11 53	7 9	2	E
21	13 7	6 40	23	21	12 43	6 45	3	F Lions back 22. 22. N.
22	14 7	6 16		22	13 53	6 22	4	G
23	15 7	5 53	23	23	14 53	5 59	5	A
24	16 7	5 30		24	15 53	5 35	6	B
25	17 7	5 6	23	25	16 53	5 12	7	C
26	18 7	4 43		26	17 52	4 49	8	D
27	19 7	4 19	23	27	18 52	4 25	9	E
28	20 7	3 56		28	19 52	4 2	10	F
				29	20 52	3 38		

March hath XXXI. days.

The Prime.	The time of the New Moon	Month day	Week day	The English Kalender.		*First Year*, ⊙ in Pisces.			Diff. of Decli.	*Second Year*, ⊙ in Pisces.		
				Suns rising	Suns setting	1669.	Suns Long.	Suns Decli.		1670	Suns Long.	Suns Decli.
	H. M			H. M	H. M.		D. M.	D. M.			D. M.	D. M.
8	9 52	1	D	David.	5 42	1	21 35	3 21	24	1	21 21	3 27
16	13 34	2	E	6 16	5 44	2	22 35	2 57		2	22 20	3 03
		3	F	6 14	5 46	3	23 34	2 34	24	3	23 20	2 40
5	2 15	4	G	6 12	5 48	4	24 34	2 10		4	24 19	2 16
13	22 24	5	A	6 10	5 50	5	25 33	1 46	24	5	25 19	1 52
		6	B	6 8	5 52	6	26 33	1 23		6	26 18	1 29
2	11 5	7	C	6 6	5 54	7	27 32	0 59	24	7	27 18	1 05
		8	D	6 4	5 56	8	28 32	0 35		8	28 18	0 41
10	7 14	9	E	6 2	5 58	9	29 31	0 12	24	9	29 17	✱ 18
		10	F	Sun in Aries.		10	♈ 31	✱ 12		10	✕ 16	0 06
18	3 23	11	G	Gregory.	2	11	1 30	0 36	24	11	1 16	0 30
7	16 4	12	A	5 56	6 4	12	2 30	1 00		12	2 15	0 54
		13	B	5 54	6 6	13	3 29	1 23	24	13	3 14	1 18
15	4 45	14	C	5 52	6 8	14	4 28	1 47		14	4 14	1 41
4	17 26	15	D	5 50	6 10	15	5 27	2 10	24	15	5 13	2 05
2	13 35	16	E	5 48	6 12	16	6 27	2 34		16	6 12	2 29
		17	F	5 46	6 14	17	7 25	2 57	24	17	7 11	3 52
1	2 16	18	G	Edward.	16	18	8 24	3 24		18	8 10	3 16
9	22 25	19	A	5 44	6 10	19	9 23	3 44	23	19	9 9	3 39
		20	B	Benedict.	20	20	10 22	4 07		20	10 8	4 02
17	11 6	21	C	5 38	6 22	21	11 21	4 30	23	21	11 7	4 25
		22	D	5 36	6 24	22	12 20	4 14		22	12 6	4 48
6	7 15	23	E	5 34	6 26	23	13 19	5 17	23	23	13 5	5 11
14	19 56	24	F	5 32	6 28	24	14 18	5 40		24	14 4	5 34
		25	G	Annun. *Mary.*		25	15 17	6 03	23	25	15 3	5 57
3	8 18	26	A	5 28	6 32	26	16 16	6 25		26	16 2	6 19
		27	B	5 26	6 34	27	17 15	6 48	23	27	17 1	6 42
1	4 46	28	C	5 24	6 36	28	18 14	7 11		28	18 0	7 05
9	17 28	29	D	5 22	6 38	29	19 12	7 33	23	29	18 58	7 27
8	13 37	30	E	5 20	6 40	30	20 11	7 55		30	19 57	7 49
		31	F	5 18	6 42	31	21 10	8 17		31	20 55	8 11

1671.	Third Year, ☉ in Pisces. Suns Long. D. M.	Suns Decli. D. M	Diff. of Decli.	1672.	Leap Year, ☉ in Pisces. Suns Long. D. M.	Suns Decli. D. M.		THE Foreign Account. And The Southing of the Stars just at Midnight.
1	21 6	3 33	24	1	21 51	3 15	11 G	
2	22 6	3 09		2	22 51	2 51	12 A	Lions Tail, 16. 28. N.
3	23 5	2 45	24	3	23 51	2 27	13 B	Great Bears Thigh, 55.
4	24 5	2 21		4	24 50	2 04	14 C	(36. N.
5	25 5	1 58	24	5	25 50	1 40	15 D	
6	26 4	1 34		6	26 49	1 16	16 E	
7	27 4	1 10	24	7	27 49	0 52	17 F	
8	28 3	0 47		8	28 48	0 29	18 G	
9	29 3	0 23	24	9	29 48	0 05	19 A	
10	♈ 2	✱ 01		10	♈ 47	✱ 19	20 B	
11	1 1	0 24	24	11	1 47	0 43	21 C	
12	2 1	0 48		12	2 46	1 06	22 D	
13	3 0	1 12	24	13	3 45	1 30	23 E	
14	3 59	1 35		14	4 45	1 53	24 F	
15	4 59	1 59	24	15	5 44	2 17	25 G	Annunciation of *Mary*.
16	5 58	2 23		16	6 43	2 41	26 A	
17	6 57	2 46	24	17	7 42	3 04	27 B	
18	7 56	3 10		18	8 41	3 27	28 C	
19	8 55	3 33	23	19	9 40	3 51	29 D	
20	9 54	3 56		20	10 39	4 14	30 E	First in Great Bears
21	10 53	4 19	23	21	11 38	4 37	31 F	(Tail, 57. 50. N.
22	11 52	4 43		22	12 37	5 00	1 G	*APRIL.*
23	12 51	5 06	23	23	13 36	5 23	2 A	
24	13 50	5 29		24	14 35	5 49	3 B	
25	14 49	5 52	23	25	15 34	6 09	4 C	
26	15 48	6 14		26	16 32	6 31	5 D	
27	16 47	6 37	23	27	17 31	6 52	6 E	(9. 21. S.
28	17 45	7 00		28	18 30	7 17	7 F	Virgins Spike, Acimon,
29	18 44	7 24	22	29	19 39	7 39	8 G	Second in Great Bears
30	19 43	7 44		30	20 37	8 01	9 A	(Tail, 56. 44. N.
31	20 41	8 06		31	21 36	8 23	10 B	

South Declination. North Declination increasing.

April hath XXX. days.

The Prime.	The time of the New Moon. H. M	Month day.	Week day.	The English Kalender. Suns rising. H. M.	Suns setting. H. M.	1669	First Year, ☉ in Aries. Suns Long. D. M.	Suns Decli. D. M.	Diff. of Decli.	1670.	Second Year, ☉ in Aries. Suns Long. D. M	Suns Decli. D. M.
16	2 18	1	G	5 16	6 44	♌ 12	22 8	8 39	22	1	21 54	8 34
5	15 0	2	A	5 14	6 46	13	23 7	6 1		2	22 53	8 56
		3	B	5 16	6 48	3	24 5	9 23	22	3	23 51	9 17
13	11 8	4	C	Ambrose. 5	50	4	25 4	9 44		4	24 50	9 39
2	23 49	5	D	5 8	6 52	5	26 2	10 6	21	5	25 48	10 1
		6	E	5 6	6 54	6	27 0	10 27		6	26 47	10 22
10	20 00	7	F	5 4	6 56	7	27 59	10 48	21	7	27 45	10 43
		8	G	5 3	6 57	8	28 58	11 9		8	28 43	11 4
18	16 7	9	A	Sun in Taurus.		9	29 56	11 30	20	9	29 42	11 25
		10	B	5 0	7 0	10	♉ 54	11 50		10	♉ 40	11 45
7	4 18	11	C	4 58	7 2	11	1 52	12 10	20	11	1 38	12 5
15	17 29	12	D	4 56	7 4	12	2 51	12 30		12	2 37	12 26
		13	E	4 54	7 6	13	3 49	12 50	20	13	3 35	12 46
4	6 10	14	F	4 52	7 8	14	4 47	13 9		14	4 33	13 5
2	2 19	15	G	4 50	7 10	15	5 4	13 29	19	15	5 31	13 25
1	15 0	16	A	4 49	7 11	16	6 43	13 49		16	6 29	13 44
		17	B	4 47	7 13	17	7 41	14 8	19	17	7 27	14 3
9	11 9	18	C	4 45	7 15	18	8 39	14 26		18	8 25	14 22
		19	D	4 43	7 17	19	9 37	14 45	18	19	9 23	14 41
17	00 00	20	E	4 41	7 19	20	10 35	15 3		20	10 21	14 59
6	20 00	21	F	4 40	7 20	21	11 33	15 21	18	21	11 19	15 17
		22	G	4 38	7 22	22	12 31	15 39		22	12 17	15 35
14	8 40	23	A	Greg.	7 24	23	13 29	15 57	17	23	13 15	15 53
3	21 2	24	B	4 35	7 25	24	14 27	16 14		24	14 13	16 10
		25	C	*Mark Evan.*		25	15 25	16 31	17	25	15 11	16 27
11	17 31	26	D	4 31	7 29	26	16 23	16 48		26	16 9	16 44
		27	E	4 29	7 31	27	17 21	17 5	16	27	17 7	17 1
19	6 12	28	F	4 28	7 32	28	18 19	17 21		28	18 5	17 17
8	2 22	29	G	4 26	7 34	29	19 16	17 27	16	29	19 4	17 33
16	15 2	30	A	4 25	7 35	30	20 14	17 52		30	20 0	17 49

Third Year, ☉ in Aries. 1671:			Diff. of Decli.	Leap Year, ☉ in Aries. 1672:			North Declination.	THE Foreign Account. And The Southing of the Stars just at Midnight.		
	Suns Long.	Suns Decli.			Suns Long.	Suns Decli.				
	D. M.	D. M			D. M.	D. M.				
1	21 40	08 29	22	1	22 24	8 45		11	C	
2	22 39	08 51		2	23 23	9 7		12	D	
3	23 37	09 12	22	3	24 22	9 29		13	E	
4	24 36	09 34		4	25 20	9 50		14	F	
5	25 34	09 56	21	5	26 28	10 11		15	G	Third in G. Bears tail
6	26 33	10 17		6	27 17	10 33		16	A	(51. 3. N
7	27 31	10 38	21	7	28 15	10 54		17	B	
8	28 29	10 59		8	29 14	11 15		18	C	Centaur's shoulder 35.
9	29 28	11 20	20	9	♉ 12	11 35		19	D	(16. S.
10	♉ 26	11 40		10	1 10	11 55		20	E	
11	1 24	12 00	20	11	2 9	12 16		21	F	
12	2 23	12 21		12	3 7	12 36		22	G	Arcturus 21. 1. N.
13	3 21	12 41	20	13	4 5	12 56		23	A	
14	4 19	13 00		14	5 3	13 15		24	B	
15	5 17	13 20	19	15	6 1	13 35		25	C	*Mark Evangelist.*
16	6 15	13 39		16	6 59	13 54		26	D	
17	7 13	13 58	19	17	7 58	14 13		27	E	
18	8 11	14 17		18	8 56	14 32		28	F	
19	9 10	14 36	18	19	9 54	14 50		29	G	(34. S.
20	10 8	14 55		20	10 52	15 8		30	A	South Ballance 14.
21	11 6	15 13	18	21	11 50	15 26		1	B	*MAY.*
22	12 4	15 31		22	12 47	15 44		2	C	
23	13 2	15 49	17	23	13 45	16 2		3	D	
24	14 0	16 36		24	14 43	16 19		4	E	
25	14 57	16 23	17	25	15 41	16 36		5	F	
26	15 55	16 40		26	16 39	16 53		6	G	(38. N.
27	16 53	16 57	17	27	17 37	17 9		7	A	Formost Guard 75.
28	17 51	17 13		28	18 35	17 25		8	B	North Ballance 8. 5. S.
29	18 48	17 29	16	29	19 32	17 41		9	C	
30	19 46	17 45		30	20 30	17 57		10	D	

May hath XXXI. days.

The Prime.	The time of the New Moon.	Month day.	Week day.	The English Kalender. Suns rising.	The English Kalender. Suns setting.	*First Year*, ☉ in Taurus. 1669. Suns Long.	*First Year*, ☉ in Taurus. 1669. Suns Decli.	Diff. of Decli.	*Second Year*, ☉ in Taurus. 1670. Suns Long.	*Second Year*, ☉ in Taurus. 1670. Suns Decli.
	H. M.			H. M.	H. M.	D. M.	D. M.		D. M.	D. M.
		1	B	*Philip & Jacob*		1 21 12	18 08	15	1 20 58	18 04
5	3 43	2	C	4 21	7 39	2 22 9	18 23		2 21 56	18 19
		3	D	Invent. of C.		3 23 7	18 37	14	3 22 53	18 34
13	0 00	4	E	4 18	7 42	4 24 5	18 52		4 23 51	18 49
2	12 33	5	F	4 16	7 44	5 25 2	19 06	14	5 24 48	19 03
		6	G	Jo. Port. Lat.		6 26 0	19 20		6 25 46	19 17
10	8 42	7	A	4 14	7 46	7 26 58	19 33	13	7 26 44	19 30
		8	B	4 13	7 47	8 27 55	19 46		8 27 41	19 43
18	4 51	9	C	4 11	7 49	9 28 53	19 59	13	9 28 39	19 56
7	17 32	10	D	Sun in Gemini		10 29 50	19 12		10 29 36	20 09
		11	E	4 8	7 52	11 ♊ 48	20 24	12	11 ♊ 34	20 21
15	06 13	12	F	4 7	7 55	12 1 45	20 36		12 1 31	20 33
4	18 54	13	G	4 6	7 54	13 2 43	20 47	11	13 2 29	20 44
12	15 03	14	A	4 5	7 55	14 3 40	20 54		14 3 26	20 56
		15	B	4 4	7 56	15 4 37	21 09	10	15 4 21	20 7
1	3 44	16	C	4 3	7 57	16 5 35	21 19		16 5 21	21 13
		17	D	4 2	7 58	17 6 32	21 29	10	17 6 18	21 27
9	00 00	18	E	4 1	7 59	18 7 30	21 39		18 7 16	21 37
17	12 35	19	F	Dunstan.	00	19 8 27	21 48	9	19 8 12	21 46
		20	G	3 59	8 1	20 9 24	21 57		20 9 10	22 55
6	8 43	21	A	3 57	8 3	21 10 22	22 05	8	21 10 8	22 03
14	21 25	22	B	3 58	8 4	22 11 19	22 13		22 11 5	22 11
		23	C	3 55	8 5	23 12 16	22 21	7	23 12 2	22 19
3	9 46	24	D	3 55	8 5	24 13 13	22 28		24 13 0	22 27
		25	E	3 54	8 6	25 14 11	22 25	7	25 13 57	22 34
11	6 15	26	F	Augustin.	7	26 15 8	22 42		26 14 54	22 40
9	18 56	27	G	3 52	8 8	27 16 5	22 48	6	27 15 51	22 46
8	15 05	28	A	3 52	8 8	28 17 2	22 54		28 16 49	22 52
		29	B	3 51	8 9	29 18 0	22 59	5	29 17 46	22 58
16	3 46	30	C	3 50	8 10	30 18 57	23 04		30 18 43	23 3
5	16 27	31	D	3 50	8 00	31 19 54	23 09		31 19 40	23 8

Third Year, ☉ in Taurus. 1671.	Suns Long. D.M.	Suns Decli. D.M	Dif. of Decli	*Leap Year*, ☉ in Taurus. 1672.	Suns Long. D.M.	Suns Decli. D.M.	North Declination increasing.	THE Foreign Account. And The Southing of the Stars just at Midnight.		
1	20 44	18 00	15	1	21 28	18 12		11	E	
2	21 42	18 15		2	22 25	18 27		12	F	(53. N.
3	22 39	18 30	14	3	23 23	18 42		13	G	North Crown, 27.
4	23 37	18 45		4	23 21	18 56		14	A	Hinder Guard, 73.16.
5	24 35	18 59	14	5	24 18	19 10		15	B	(N.
6	25 32	19 13		6	25 16	19 23		16	C	Serpents neck, 7.33.N.
7	26 30	19 27	13	7	26 13	19 37		17	D	
8	27 27	19 40		8	27 11	19 50		18	E	
9	28 25	19 53	13	9	28 09	19 03		19	F	
10	28 22	20 06		10	29 06	20 15		20	G	
11	29 20	20 18	12	11	♊ 04	20 27		21	A	
12	♊ 17	20 30		12	1 01	20 39		22	B	
13	1 15	20 41	11	13	2 58	20 50		23	C	
14	2 12	20 53		14	3 56	21 01		24	D	
15	3 14	21 04	10	15	4 53	21 11		25	E	*Mark* Evangelist.
16	4 07	21 14		16	5 50	21 23		26	F	Scorpions Heart, 25.
17	5 04	21 24	10	17	6 48	21 32		27	G	(36. S.
18	6 02	21 34		18	7 45	21 41		28	A	
19	7 59	21 44	09	19	8 43	21 50		29	B	
20	8 57	21 53		20	9 40	21 59		30	C	
21	10 54	22 00	08	21	10 37	21 08		31	D	
22	11 51	22 09		22	11 35	22 16		1	E	*JUNE.*
23	12 48	22 17	07	23	12 32	22 23		2	F	
24	13 46	22 25		24	13 29	22 30		3	G	(13. S.
25	14 43	22 32	07	25	14 27	22 37		4	A	Serpentar. knee, 15.
26	14 41	22 39		26	15 24	22 44		5	B	(50. N.
27	15 38	22 45	06	27	16 21	22 50		6	C	Hercules Head, 14.
28	16 35	22 51		28	17 18	22 55		7	D	
29	17 32	22 57	05	29	18 15	23 00		8	E	
30	18 29	23 02		30	19 13	23 05		9	F	
31	19 26	23 07		31	20 10	23 10		10	G	

June hath XXX. days.

The Prime.	The time of the New Moon. H. M.	Month day.	Week day.	The English Kalender. Suns rising H. M.	Suns setting H. M.	First Year, ☉ in Gemini. 1669	Suns Long. D. M.	Suns Decli. D. M.	Diff. of Decli.	Second Year, ☉ in Gemini. 1670.	Suns Long. D. M.	Suns Decli. D. M.
		1	E	3 49	8 11	1	20 51	22 13	4	1	20 37	23 12
13	12 36	2	F	3 49	8 11	2	21 48	23 17		2	21 34	23 16
		3	G	3 49	8 11	3	22 45	23 20		3	22 32	23 19
2	11 17	4	A	3 49	8 12	4	23 43	23 23		4	23 29	23 22
10	11 26	5	B	Boniface.	12	5	24 40	23 26	2	5	24 26	23 25
		6	C	3 48	8 12	6	25 37	23 28		6	25 23	23 27
18	17 35	7	D	3 47	8 12	7	26 34	23 29	1	7	26 20	23 29
		8	E	3 47	8 13	8	27 31	23 31		8	27 17	23 30
7	6 16	9	F	3 47	8 13	9	28 28	23 31		9	28 15	23 31
15	18 57	10	G	3 47	8 13	10	29 25	23 32		10	29 12	23 32
		11	A	Longest Day.		11	♋ 23	23 32		11	♋ 09	23 32
4	7 38	12	B	Sun in Cancer.		12	1 20	23 31		12	1 06	23 32
12	3 47	13	C	Dayes short.		13	2 17	23 31	1	13	2 03	23 31
1	16 29	14	D	3 47	8 13	14	3 14	23 30		14	3 00	23 30
		15	E	3 47	8 13	15	4 11	23 28	2	15	4 57	23 28
9	12 37	16	F	3 48	8 12	16	5 8	23 26		16	5 55	23 27
		17	G	3 48	8 12	17	6 5	23 24	3	17	6 51	23 25
17	1 19	18	A	3 48	8 12	18	7 2	23 21		18	7 48	23 22
6	21 27	19	B	3 49	8 11	19	7 59	23 17	4	19	8 46	23 18
		20	C	Edwar.	8 11	20	8 56	23 14		20	9 43	23 15
14	10 09	21	D	3 49	8 11	21	9 54	23 10	5	21	10 40	23 11
3	22 30	22	E	3 50	8 11	22	10 51	23 5		22	11 37	23 6
		23	F	3 50	8 11	23	11 48	23 0	5	23	12 34	23 1
11	19 00	24	G	*John* Baptist.		24	12 45	22 55		24	13 31	23 56
		25	A	3 52	8 8	25	13 42	22 49	6	25	13 28	22 50
19	7 40	26	B	3 52	8 8	26	14 39	22 43		26	14 25	22 44
8	3 49	27	C	3 53	8 7	27	15 36	22 37	7	27	15 22	22 38
16	16 30	28	D	3 54	8 6	28	16 33	22 30		28	16 20	22 21
		29	E	*Peter* Apostle.		29	17 30	22 23	8	29	17 17	22 24
5	5 11	30	F	3 56	8 4	30	18 28	22 15		30	18 14	22 17

Third Year, ☉ in Gemini. 1671.	Suns Long. D. M.	Suns Decli. D. M.	Diff. of Decli.	Leap Year, ☉ in Gemini. 1672.	Suns Long. D. M.	Suns Decli. D. M.			THE Foreign Account. And The Southing of the Stars just at Midnight.
1	20 24	23 11	4	1	21 7	23 18		11	A
2	21 21	23 15		2	22 4	23 14		12	B
3	22 18	23 18	3	3	23 1	23 21		13	C
4	23 25	23 21		4	23 58	23 24		14	D
5	24 12	23 24	2	5	24 56	23 26		15	E
6	25 9	23 27		6	25 53	25 28		16	F
7	26 7	23 29	1	7	26 50	23 30		17	G *Sagittar.* Arrow head,
8	27 4	23 30		8	27 47	23 31		18	A Dragons head, 51.
9	28 1	23 31		9	28 44	23 32		19	B (36. N.
10	28 58	23 32		10	29 41	23 32		20	C
11	29 55	23 32		11	☋ 38	23 32		21	D
12	☋ 52	23 32		12	1 36	23 31		22	E
13	1 49	23 31	1	13	2 33	23 30		23	F
14	2 46	23 30		14	3 30	23 29		24	G *John* Baptist.
15	3 43	23 28	2	15	4 27	23 27		25	A
16	4 41	23 27		16	5 24	23 25		26	B
17	5 38	23 25	3	17	6 21	23 23		27	C The Harp, 38. 30. N.
18	6 35	23 22		18	7 18	23 20		28	D
19	7 32	23 19	4	19	8 15	23 16		29	E
20	8 29	23 15		20	9 12	23 13		30	F
21	9 26	23 12	5	21	10 9	23 9		1	G JULY.
22	10 23	23 7		22	11 7	23 4		2	A
23	11 20	23 3	6	23	12 4	22 59		3	B
24	12 17	22 58		24	13 1	22 53		4	C
25	13 14	22 52	7	25	13 58	22 48		5	D
26	14 12	22 46		26	14 55	22 42		6	E
27	15 9	22 40	8	27	15 52	22 35		7	F
28	16 6	22 33		28	16 41	22 28		8	G
29	17 3	22 26	9	29	17 46	22 21		9	A
30	18 0	22 19		30	18 44	22 13		10	B Swans Bill, 27. 17. N.

North Declination increasing.

North Declination decreasing.

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July hath XXXI. days.

The Prime.	New Moon.	The time of the	Month day.	Week day.	The English Kalender. Suns rising.	Suns setting.	First Year, ⊙ in Cancer. 1669	Suns Long.	Suns Decli.	Diff. of Decli.	Second Year, ⊙ in Cancer. 1670	Suns Long.	Suns Decli.
	H. M.				H. M.	H. M.		D. M.	D. M.			D. M.	D. M.
			1	G	Visitat. *Mary.*		1	19 25	22 07	08	1	19 11	22 09
13	1	20	2	A	3 57	8 3	2	20 22	21 59		2	20 08	22 01
2	14	1	3	B	Martin.	8 2	3	21 19	21 50	09	3	21 05	21 52
			4	C	3 59	8 1	4	22 16	21 41		4	22 02	21 43
10	10	10	5	D	4 1	7 59	5	23 13	21 32	10	5	23 00	21 34
			6	E	4 2	7 58	6	24 11	21 22		6	23 57	21 24
18	6	19	7	F	4 3	7 57	7	25 08	21 11	10	7	24 54	21 14
7	19	00	8	G	4 4	7 56	8	26 05	21 01		8	25 51	21 04
			9	A	4 5	7 55	9	27 02	20 50	11	9	26 48	20 53
15	7	41	10	B	4 6	7 54	10	28 59	20 39		10	27 46	20 42
4	20	22	11	C	4 7	7 53	11	28 57	20 27	12	11	28 43	20 30
12	16	31	12	D	Sun in Leo.		12	29 54	20 15		12	29 40	20 18
			13	E	4 10	7 50	13	♌ 51	20 03	13	13	♌ 37	20 06
1	5	12	14	F	4 11	7 49	14	1 48	19 50		14	1 35	19 53
			15	G	Swithin.	48	15	2 46	19 37	13	15	2 32	19 40
9	1	21	16	A	4 14	7 46	16	3 43	19 24		16	3 30	19 27
17	14	3	17	B	4 15	7 45	17	4 40	19 10	14	17	4 27	19 14
			18	C	4 17	7 43	18	5 38	18 56		18	5 24	19 00
6	10	11	19	D	Dog-days be.		19	6 35	18 42	14	19	6 21	18 45
14	22	53	20	E	Margar.	40	20	7 32	18 27		20	7 19	18 31
			21	F	4 21	7 39	21	8 30	18 12	15	21	8 16	18 16
3	11	14	22	G	Magdal.	37	22	9 27	17 57		22	9 13	18 01
			23	A	4 25	7 35	23	10 25	17 42	16	23	10 11	17 46
11	7	43	24	B	4 26	7 31	24	11 22	17 26		24	11 08	17 30
19	20	24	25	C	*James* Apost.		25	12 20	17 10	16	25	12 06	17 14
8	16	33	26	D	Anno	7 30	26	13 17	16 54		26	13 03	16 58
			27	E	4 31	7 29	27	14 15	16 37	17	27	14 01	16 41
16	17	14	28	F	4 33	7 27	28	15 12	16 20		28	14 58	16 24
5		55	29	G	4 35	7 25	29	16 10	16 03	17	29	15 56	16 07
			30	A	4 36	7 24	30	17 07	15 46		30	16 53	15 50
13	4	14	31	B	4 38	7 22	31	18 05	15 28		31	17 51	15 32

Third Year, ⊙ in Cancer.			Diff. of Decli.	Leap Year, ⊙ in Cancer.			North Declination decreasing.	THE Foreign Account. And The Southing of the Stars just at Midnight.		
1671.	Suns Long. D. M.	Suns Decli. D. M		1672.	Suns Long. D. M.	Suns Decli. D. M.				
1	18 57	22 01	08	1	19 41	22 05		11	C	
2	19 54	22 03		2	20 39	21 56		12	D	
3	20 52	21 54	09	3	21 35	21 48		13	E	
4	21 49	21 45		4	22 32	21 38		14	F	♐ Thigh, and Vultures
5	22 46	21 36	10	5	23 29	21 29		15	G	(Heart, 35. 27. S. 8.
6	23 43	21 26		6	24 26	21 19		16	A	(2. N.
7	24 40	21 16	10	7	25 24	21 08		17	B	
8	25 37	21 06		8	26 21	20 58		18	C	
9	26 35	20 55	11	9	27 18	20 47		19	D	
10	27 33	20 44		10	28 15	20 35		20	E	
11	28 29	20 33	12	11	29 13	20 24		21	F	
12	29 26	20 21		12	♑ 10	20 12		22	G	
13	♑ 24	20 09	13	13	1 07	19 59		23	A	
14	1 21	19 56		14	2 04	19 47		24	B	
15	2 18	19 43	13	15	3 02	19 33		25	C	*James* Apostle.
16	3 15	19 30		16	3 59	19 20		26	D	
17	4 13	19 17	14	17	4 56	19 06		27	E	Swans Tayl, and Dol-
18	5 10	19 03		18	5 54	18 52		28	F	phins Head, 44. 6. N.
19	6 07	18 49	14	19	6 51	18 38		29	G	(14. 57. N.
20	7 05	18 34		20	7 48	18 23		30	A	
21	8 02	18 20	15	21	8 46	18 03		31	B	
22	9 00	18 05		22	9 43	17 53		1	C	*AUGUST.*
23	10 57	17 49	16	23	10 41	17 37		2	D	
24	11 54	17 34		24	11 38	17 22		3	E	
25	12 52	17 18	16	25	12 36	17 05		4	F	
26	13 42	17 02		26	13 33	16 49		5	G	
27	14 47	16 45	17	27	14 32	16 32		6	A	
28	15 44	16 29		28	15 28	16 16		7	B	
29	16 42	16 11	17	29	16 26	15 58		8	C	
30	17 39	15 54		30	17 23	15 41		9	D	
31	18 37	15 37		31	18 21	15 23		10	E	

August hath XXXI. days.

The Prime.	The time of the New Moon.	Month day.	Week day.	The English Kalender. Suns rising.	Suns setting.	*First Year*, ☉ in Leo. 1669	Suns Long.	Suns Decli.	Diff. of Decli.	*Second Year*, ☉ in Leo. 1670.	Suns Long.	Suns Decli
	H. M.			*H. M.*	*H. M.*		*D. M.*	*D. M.*			*D. M*	*D. M.*
		1	C	Lammas	20	1	19 2	15 10	18	1	18 48	15 13
2	2 45	2	D	4 41	7 19	2	20 0	14 52		2	19 46	14 56
10	22 54	3	E	4 43	7 17	3	21 58	14 34	19	3	20 41	14 38
		4	F	4 44	7 16	4	22 55	14 15		4	21 41	14 19
18	19 3	5	G	4 46	7 14	5	23 53	13 56	19	5	22 39	14 1
		6	A	4 48	7 12	6	24 51	13 37		6	23 37	13 42
7	7 44	7	B	4 50	7 10	7	25 48	13 18	19	7	24 36	13 22
15	20 25	8	C	4 52	7 7	8	26 46	12 59		8	25 32	13 3
		9	D	4 53	7 8	9	26 44	12 39	20	9	26 30	12 43
4	9 6	10	E	Laurence.	5	10	27 42	12 19		10	27 28	12 23
12	5 15	11	F	4 57	7 3	11	28 40	11 59	20	11	28 26	12 3
1	17 57	12	G	4 59	7 1	12	29 38	11 39		12	29 24	11 43
		13	A	Sun in Virgo.		13	♍ 35	11 19	21	13	♍ 22	11 23
9	14 5	14	B	5 2	6 08	14	1 33	10 58		14	1 19	11 3
		15	C	5 4	6 56	15	2 31	10 37	21	15	2 17	10 42
17	2 47	16	D	5 7	6 54	16	3 29	10 16		16	3 15	10 21
6	22 55	17	E	5 8	6 52	17	4 27	9 55	21	17	4 13	10 0
14	11 37	18	F	5 10	6 50	18	5 25	9 34		18	5 11	9 39
		19	G	5 12	6 48	19	6 23	9 12	21	19	6 9	9 17
		20	A	5 14	6 46	20	7 21	8 51		20	7 8	8 56
3	0 0	21	B	5 16	6 44	21	8 20	8 21	22	21	8 6	8 34
11	20 27	22	C	5 18	6 42	22	9 18	8 7		22	9 4	8 12
		23	D	5 20	6 40	23	10 16	7 25	22	23	10 2	7 50
19	9 8	24	E	Bartholomew.		24	11 14	7 43		24	11 0	7 28
8	5 17	25	F	5 24	6 36	25	12 12	7 1	23	25	11 58	7 6
16	17 58	26	G	5 26	6 34	26	13 11	6 38		26	12 57	6 43
		27	A	5 28	6 32	27	14 9	6 16	23	27	13 55	6 21
5	6 39	28	B	Dog-days end		28	15 7	5 53		28	14 53	5 58
		29	C	*John* beheaded		29	16 6	5 30	23	29	15 52	5 15
13	2 48	30	D	5 33	6 27	30	17 4	5 48		30	16 50	5 53
2	15 29	31	E	5 35	6 25	31	18 3	4 45		31	17 49	4 40

1671.	Third Year, ⊙ in Leo. Suns Long. D. M.	Suns Decli. D. M	Diff. of Decli	1672.	Leap Year, ⊙ in Leo. Suns Long. D. M.	Suns Decli. D. M.	North Declination decreasing.	THE Foreign Account. And The Southing of the Stars just at Midnight.
1	18 35	15 16	18	1	19 18	15 06	11 F	
2	19 32	15 01		2	20 16	14 47	12 G	Pegasus mouth, and
3	20 30	14 45	19	3	21 14	14 29	13 A	Capricorns tayl.
4	21 27	14 24		4	22 11	14 10	14 B	
5	22 25	14 06	19	5	23 9	13 51	15 C	
6	23 23	13 47		6	24 7	13 32	16 D	
7	24 11	13 27	19	7	25 4	13 12	17 E	
8	25 18	13 07		8	26 2	12 53	18 F	
9	26 16	12 48	20	9	27 0	12 32	19 G	
10	27 14	12 29		10	27 8	12 14	20 A	
11	28 12	12 09	20	11	28 56	11 53	21 B	
12	29 10	11 49		12	29 54	11 33	22 C	
13	♍ 8	11 28	21	13	♍ 52	11 12	23 D	
14	1 5	11 08		14	1 50	10 52	24 E	*Bartholomew* Apostle.
15	2 3	10 47	21	15	2 47	10 31	25 F	
16	3 1	10 26		16	3 45	10 10	26 G	
17	3 59	10 05	21	17	4 43	9 49	27 A	
18	4 57	9 44		18	5 41	9 28	28 B	
19	5 55	9 23	22	19	6 40	9 06	29 C	
20	6 53	9 01		20	7 38	8 44	30 D	
21	7 52	8 39	22	21	8 36	8 23	31 E	*Fomahant.*
22	8 50	8 17		22	9 34	8 01	1 F	*SEPTEMBER.*
23	9 48	7 55	22	23	10 32	7 39	2 G	Pegasus shoulder, 26.
24	10 46	7 33		24	11 30	7 17	3 A	(15. N. and Wing 13.
25	11 44	7 11	23	25	12 29	6 54	4 B	(24. N.
26	12 43	7 49		26	13 27	6 32	5 C	
27	13 41	6 26	23	27	14 25	6 09	6 D	
28	14 39	6 04		28	15 24	5 46	7 E	
29	15 38	5 41	23	29	16 22	5 24	8 F	
30	16 36	5 18		30	17 20	5 01	9 G	
31	17 35	4 55		31	18 19	4 38	10 A	

September hath XXX. days.

The Prime.	The time of the New Moon. H. M	Month day.	Week day.	The English Kalender, Suns rising H. M	Suns setting H. M.	1669.	*First Year*, ⊙ in Virgo. Suns Long. D. M.	Suns Decli. D. M.	Diff. of Decli.	1670.	*Second Year*, ⊙ in Virgo. Suns Long. D. M.	Suns Decli. D. M.
		1	F	Giles. 6 23		1	19 01	4 22	24	1	18 47	4 27
10	1 38	2	G	5 39	6 21	2	20 00	3 58		2	19 46	4 03
		3	A	5 41	6 29	3	20 58	3 36	24	3	20 44	3 41
18	7 47	4	B	5 43	6 17	4	21 57	3 12		4	21 43	3 17
7	10 28	5	C	5 45	6 15	5	22 55	2 49	24	5	22 41	2 55
		6	D	5 47	6 13	6	23 54	2 26		6	23 40	2 33
15	9 9	7	E	Nat. Elizab.		7	24 53	2 02	24	7	24 39	2 08
4	21 50	8	F	Nat. Mary.		8	25 52	1 39		8	25 37	1 45
12	18 0	9	G	5 35	6 7	9	26 50	1 16	24	9	26 36	1 22
		10	A	5 55	6 5	10	27 49	0 52		10	27 35	0 58
1	6 41	11	B	5 56	6 3	11	28 48	0 29	24	11	28 34	0 35
		12	C	5 59	6 1	12	29 47	0 05		12	29 33	0 11
9	2 50	13	D	Sun in Libra.		13	♎ 46	0 18	24	13	♎ 31	0 13
17	15 35	14	E	Holy Croſs.		14	1 45	0 42		14	1 30	0 36
		15	F	6 5	5 55	15	2 44	1 North. 05	24	15	2 29	1 North. 00
6	11 40	16	G	6 7	5 53	16	3 43	1 ✱ 29		16	3 28	1 ✱ 23
		17	A	Lambert.	51	17	4 42	1 South. 52	24	17	4 27	1 South. 47
14	0 21	18	B	6 10	5 50	18	5 41	2 16		18	5 26	2 10
3	12 42	19	C	6 12	5 48	19	6 40	2 39	24	19	6 25	2 34
		20	D	6 13	5 46	20	7 39	3 03		20	7 25	2 57
11	9 11	21	E	*Matth.* Ap.		21	8 38	3 26	23	21	8 24	3 21
19	21 52	22	F	6 18	5 42	22	9 37	3 49		22	9 23	3 44
8	18 1	23	G	6 20	5 40	23	10 37	4 13	23	23	10 22	4 08
16	16 42	24	A	6 22	5 38	24	11 36	4 36		24	11 22	4 31
		25	B	Cyprian.	36	25	12 35	4 59	23	25	12 21	4 54
5	19 23	26	C	6 26	5 34	26	13 35	5 23		26	13 20	5 17
		27	D	6 28	5 32	27	14 34	5 46	23	27	14 20	5 40
13	15 32	28	E	6 30	5 30	28	15 33	6 09		28	15 19	6 04
		29	F	*Michael* An.		29	16 33	6 32	23	29	16 19	6 27
2	4 13	30	G	Hierom. 5 26		30	17 32	6 54		30	17 18	6 49

1671.	Third Year, ⊙ in Virgo. Suns Long. D M.	Suns Decli. D. M	Diff. of Decli.	1672.	Leap Year, ⊙ in Virgo. Suns Long. D M.	Suns Decli. D.M	North Declination decreasing. South Declination increasing.		THE Foreign Account. And The Southing of the Stars just at Midnight.
1	18 33	04 33	23	1	19 17	04 15		11	B
2	19 31	04 10		2	20 16	03 52		12	C
3	20 30	03 47	24	3	21 14	03 29		13	D
4	21 29	03 23		4	22 13	03 06		14	E
5	22 27	03 00	24	5	23 12	02 42		15	F
6	23 26	02 37		6	24 10	02 19		16	G
7	24 24	02 14	24	7	25 9	01 56		17	A
8	25 23	01 50		8	26 8	01 32		18	B
9	26 22	01 28	24	9	27 6	01 09		19	C (17.14.N.
10	27 21	01 03		10	28 5	00 46		20	D Head *Andro. Caſ.* chair
11	28 19	00 40	24	11	29 4	00 22		21	E *Ma. A. Pegaſus* wing-
12	29 18	00 17		12	♎ 3	00 01		22	F (tip, 13.18.N.
13	♎ 17	00 07	24	13	1	00 25		23	G North in Whales tail,
14	1 16	00 30		14	2	00 48		24	A (10.41.S.
15	2 15	00 54	24	15	3	01 12		25	B
16	3 14	01 17		16	3 59	01 36		26	C
17	4 13	01 41	24	17	4 58	01 59		27	D
18	5 12	02 04		18	5 57	02 22		28	E
19	6 11	02 28	24	19	6 56	02 46		29	F *Michael* Archangel.
20	7 10	02 51		20	7 55	03 09		30	G South in Whales tail.
21	8 9	03 15	23	21	8 54	03 32		1	A OCTOBER.
22	9 9	03 38		22	9 54	03 56		2	B Pole Star, 87.30. N.
23	10 8	04 02	23	23	10 53	04 19		3	C (19.51.S.
24	11 7	04 25		24	11 52	04 42		4	D
25	12 7	04 48	23	25	12 52	05 06		5	E
26	13 6	05 11		26	13 51	05 29		6	F South in *Andromeda's*
27	14 5	05 34	23	27	14 50	05 52		7	G (Girdle, 33.52.N.
28	15 5	05 58		28	15 50	06 15		8	A
29	16 4	06 21	23	29	16 49	06 28		9	B
30	17 4	06 44		30	17 49	07 01		10	C *Caſſiopia's* knee, 58.
									(27.N.

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October hath XXXI. days.

The Prime.	The time of the New Moon.	Month day	Weekday	The English Kalender.		First Year, ☉ in Libra.			Diff. of Decli.	Second Year, ☉ in Libra.		
				Suns rising	Suns setting	1669.	Suns Long.	Suns Decli.		1670.	Suns Long.	Suns Decli.
H. M	H. M			H. M.	H. M.		D. M.	D. M.			D. M.	D. M.
		1	A	6 36	5 24	1	18 32	7 17	23	1	18 18	7 11
10	0 22	2	B	6 33	5 22	2	19 32	7 40		2	19 17	7 34
17	20 31	3	C	6 40	5 20	3	20 32	8 03	22	3	20 17	7 57
		4	D	6 42	5 18	4	21 31	8 25		4	21 16	8 19
7	9 12	5	E	6 44	5 16	5	22 31	8 48	22	5	22 16	8 43
15	21 53	6	F	Faith.	5 14	6	23 30	9 10		6	23 16	9 05
		7	G	6 48	5 12	7	24 30	9 32	22	7	24 16	9 26
4	10 34	8	A	6 50	5 10	8	25 30	9 54		8	25 15	9 48
12	6 44	9	B	Dennis.	5 8	9	26 30	10 16	22	9	26 15	10 10
1	19 25	10	C	6 54	5 6	10	27 30	10 37		10	27 15	10 33
		11	D	6 56	5 4	11	28 29	10 59	21	11	28 15	10 53
9	15 34	12	E	6 58	5 2	12	29 29	11 20		12	29 15	11 15
		13	F	Sun in Scorpio		13	♏ 29	11 41	21	13	♏ 15	11 36
17	4 15	14	G	7 2	4 58	14	1 29	12 02		14	1 15	11 57
		15	A	7 3	4 57	15	2 29	12 23	21	15	2 15	12 18
9	0 24	16	B	7 5	4 55	16	3 30	12 44		16	3 15	12 39
14	13 5	17	C	7 7	4 53	17	4 30	13 04	20	17	4 15	12 59
		18	D	Luke Evang.		18	5 30	13 24		18	5 15	13 19
3	1 26	19	E	7 11	4 49	19	6 30	13 44	20	19	6 15	13 39
11	21 55	20	F	7 13	4 47	20	7 30	14 04		20	7 16	13 59
		21	G	7 14	4 46	21	8 30	14 24	19	21	8 16	14 19
19	10 36	22	A	7 16	4 44	22	9 31	14 43		22	9 16	14 38
8	6 45	23	B	7 18	4 43	23	10 31	15 02	19	23	10 16	14 58
16	19 26	24	C	7 20	4 40	24	11 32	15 21		24	11 17	15 17
		25	D	Crispine.	4 38	25	12 32	15 40	18	25	12 17	15 35
5	8 7	26	E	7 23	4 37	26	13 32	15 58		26	13 18	15 54
		27	F	7 25	4 35	27	14 32	16 16	18	27	14 18	16 12
13	4 16	28	G	Simon & Jude		28	15 33	16 34		28	15 19	16 29
2	16 57	29	A	7 29	4 31	29	16 34	16 51	17	29	16 19	16 46
		30	B	7 30	4 30	30	17 34	17 07		30	17 19	17 04
10	13 6	31	C	7 32	4 28	31	18 35	17 25		31	18 20	17 21

Third Year, ☉ in Libra.			Diff. of Decli.	Leap Year, ☉ in Libra.				THE Foreign Account, And The Southing of the Stars just at Midnight.		
1677.	Suns Long.	Suns Decli.		1672.	Suns Long.	Suns Decli.				
	D M.	D. M			D M.	D. M				
1	18 3	07 06	23	1	18 48	07 23	South Declination increasing.	11	D	
2	19 3	07 29		2	19 48	07 46		12	E	
3	20 2	07 52	22	3	20 48	08 09		13	F	
4	21 2	08 14		4	21 47	08 31		14	G	
5	22 2	08 37	22	5	22 47	08 54		15	A	
6	23 2	08 59		6	23 47	09 16		16	B	
7	24 1	09 21	22	7	24 47	09 38		17	C	
8	25 1	09 43		8	25 46	10 00		18	D	*Luke* Evangelist.
9	26 1	10 05	22	9	26 46	10 22		19	E	N. and S. in the Rams
10	27 1	10 27		10	27 46	10 43		20	F	Horn, 19. 9. N. 17
11	28 1	10 48	21	11	28 46	11 05		21	G	(38. N
12	29 0	11 10		12	29 46	11 26		22	A	Rams head, 21. 51. N.
13	♏ 0	11 31	21	13	♏ 46	11 47		23	B	
14	1 0	11 52		14	1 46	12 08		24	C	
15	2 0	12 13	21	15	2 46	12 29		25	D	
16	3 0	12 34		16	3 46	12 49		26	E	
17	4 1	12 54	20	17	4 46	13 09		27	F	
18	5 1	13 14		18	5 46	13 30		28	G	*Simon* and *Jude*.
19	6 1	13 34	20	19	6 47	13 50		29	A	
20	7 1	13 54		20	7 47	14 10		30	B	
21	8 1	14 14	19	21	8 47	14 29		31	C	
22	9 2	14 33		22	9 47	14 48		1	D	NOVEMBER.
23	10 2	14 53	19	23	10 48	15 07		2	E	
24	11 2	15 12		24	11 48	15 26		3	F	
25	12 2	15 30	18	25	12 48	15 44		4	G	
26	13 3	15 49		26	13 49	16 03		5	A	
27	14 3	16 07	18	27	14 49	16 21		6	B	Whales Jaw, and *Me-*
28	15 4	16 24		28	15 50	16 38		7	C	*dusa's* head, 44. N.
29	16 4	16 43	17	29	16 50	16 56		8	D	(39. 33. N.
30	17 5	17 06		30	17 50	17 13		9	E	*Perseus* side, 48. 13. N.
31	18 5	17 17		31	19 51	18 30		10	F	

November hath XXX. days.

The Prime.	The time of the New Moon. H. M	Month day	Week day	The English Kalender. Suns rising H. M	Suns setting H. M.	First Year, ☉ in Scorpio. 1669	Suns Long. D. M.	Suns Decli. D. M.	Diff. of Decli	Second Year, ☉ in Scorpio. 1670	Suns Long. D. M.	Suns Decli. D M.
		1	D	*All Saints.*		1	19 35	17 42	16	1	19 21	17 38
18	9 15	2	E	7 36	4 24	2	20 36	17 58		2	20 21	17 54
7	21 56	3	F	7 37	4 23	3	21 37	18 14	16	3	21 22	18 10
		4	G	7 26	4 21	4	22 37	18 30		4	22 23	18 26
15	10 38	5	A	*Powder Plot.*		5	23 38	18 45	15	5	23 23	18 42
4	23 20	6	B	Leonard.	17	6	24 39	19 04		6	24 24	18 57
12	15 28	7	C	7 44	4 16	7	25 40	19 15	14	7	25 25	19 11
		8	D	7 45	4 15	8	26 40	19 29		8	26 26	19 25
1	8 9	9	E	7 47	4 13	9	27 41	19 43	14	9	27 26	19 39
		10	F	7 48	4 12	10	28 42	20 57		10	28 27	19 53
9	4 18	11	G	Martin.	11	11	29 43	20 10	13	11	29 28	20 07
17	17 0	12	A	Sun in Sagita.		12	2 44	20 23		12	2 29	20 20
		13	B	7 52	4 8	13	1 45	20 35	13	13	1 30	20 32
6	13 8	14	C	7 53	4 7	14	2 46	20 48		14	2 31	20 44
		15	D	7 55	4 5	15	3 46	21 59	12	15	3 32	20 56
14	1 49	16	E	7 56	4 4	16	4 47	21 10		16	4 33	20 08
3	14 10	17	F	Qu. *Elizab.*		17	5 48	21 21	11	17	5 34	21 16
		18	G	7 58	4 2	18	6 49	21 32		18	6 35	21 30
11	10 39	19	A	7 53	4 1	19	7 50	21 42	10	19	7 36	21 40
19	23 20	20	B	Edmond.	0	20	8 51	21 52		20	8 37	21 50
8	19 29	21	C	8 1	3 59	21	9 53	22 01	09	21	9 38	21 59
		22	D	Cicily.	3 59	22	10 54	22 10		22	10 39	22 08
16	8 10	23	E	Clement.	59	23	11 55	22 18	08	23	11 40	22 16
5	20 51	24	F	8 4	3 6	24	12 56	22 26		24	12 41	22 24
		25	G	Katherine.	55	25	13 57	22 34	07	25	13 42	22 32
13	17 0	26	A	8 6	3 54	26	14 58	22 41		26	14 43	22 39
		27	B	8 7	3 55	27	15 59	22 47	06	27	15 45	22 46
2	5 41	28	C	8 8	3 52	28	17 01	22 54		28	16 46	22 54
		29	D	8 9	3 51	29	18 02	22 49	05	29	17 47	22 58
10	1 50	30	E	*Andrew* Apo.		30	19 03	23 05		30	18 48	23 03

Third Year, ☉ in Scorpio.			Diff. of Decli.	*Leap Year*, ☉ in Scorpio.			South Declination increasing.	THE Foreign Account. And The Southing of the Stars just at Midnight.		
1671.	Suns Long.	Suns Decli.		1672.	Suns Long.	Suns Decli.				
	D. M.	D. M			D. M.	D. M.				
1	19 6	17 34	16	1	19 52	17 46		11	G	
2	20 7	17 50		2	20 53	18 03		12	A	
3	21 7	18 06	16	3	21 53	18 11		13	B	
4	22 8	18 22		4	22 54	18 34		14	C	
5	23 9	18 38	15	5	23 55	18 49		15	D	
6	24 9	18 53		6	24 55	19 04		16	E	
7	25 10	19 08	14	7	25 56	19 19		17	F	*Perseus* Foot, 30. 52. N.
8	26 11	19 22		8	26 57	19 83		18	G	
9	27 12	19 39	14	9	27 58	19 47		19	A	
10	28 13	19 50		10	28 59	20 00		20	B	
11	29 13	20 04	13	11	29 59	20 13		21	C	
12	♐ 14	20 16		12	♐ 1 0	20 26		22	D	
13	1 15	20 29	12	13	2 1	20 39		23	E	
14	2 16	20 42		14	3 2	20 51		24	F	
15	3 17	20 53	11	15	4 3	20 02		25	G	
16	4 18	21 05		16	5 4	21 13		26	A	
17	5 19	21 16	11	17	6 5	21 24		27	B	
18	6 20	21 27		18	7 6	21 35		28	C	Bulls Eye, 15. 47. N.
19	7 21	21 37	10	19	8 7	21 45		29	D	
20	8 22	21 47		20	9 8	21 54		30	E	*Andrew* Apostle.
21	9 23	21 57	09	21	10 9	21 03		1	F	*DECEMBER.*
22	10 24	22 06		22	11 10	22 12		2	G	
23	11 25	22 14	08	23	12 12	22 20		3	A	
24	12 26	22 22		24	13 13	22 28		4	B	
25	13 27	22 30	07	25	14 14	22 36		5	C	The Goat, 45. 36. N.
26	14 29	22 37		26	15 15	22 43		6	D	
27	15 30	22 44	06	27	16 16	22 49		7	E	*Orions* Foot, 8. 37. S.
28	16 31	22 51		28	17 17	22 55		8	F	
29	17 32	22 57	05	29	18 19	22 01		9	G	*Orions* first shoulder,
30	18 33	23 02		30	19 20	23 06		10	A	(06. 00. N.

December hath XXXI. days.

The Prime.	New Moon.	The time of the	Month day.	Week day.	The English Kalender. Suns rising.	Suns setting.	*First Year*, ☉ in Sagitar. 1676. Suns Long.	Suns Decli.	Diff. of Decli.	*Second Year*, ☉ in Sagitar. 1677. Suns Long.	Suns Decli
	H. M.				H. M.	H. M.	D. M.	D. M.		D. M	D. M.
18	14	31	1		8 10	3 50	1 20 04	23 10	04	1 19 09	23 08
			2	G	8 11	3 49	2 21 05	23 14		2 20 51	23 13
7	10	40	3	A	8 11	3 49	3 22 07	23 18	03	3 21 52	23 17
15	23	22	4	B	8 12	3 48	4 23 08	23 21		4 22 53	23 20
			5	C	8 12	3 48	5 24 09	23 24		5 23 54	23 23
4	12	2	6	D	8 12	3 48	6 25 11	23 27		6 24 56	23 26
12	8	12	7	E	8 12	3 48	7 26 12	23 29	02	7 25 57	23 28
1	20	53	8	F	Con. *Mary.*		8 27 13	23 30		8 26 58	23 30
			9	G	8 13	3 47	9 28 14	23 31		9 28 00	23 31
9	17	2	10	A	8 13	3 47	10 29 16	23 32		10 29 01	23 32
			11	B	Shortest day.		11 ♑ 17	23 31		11 ♑ 02	23 32
17	5	43	12	C	Sun in Capric.		12 1 18	23 32		12 1 03	23 32
			13	D	Lucie.	3 47	13 2 20	23 31	01	13 2 05	23 31
6	1	50	14	E	8 13	3 47	14 3 21	23 29		14 3 06	23 30
14	14	33	15	F	8 13	3 47	15 4 22	23 28	02	15 4 07	23 29
			16	G	8 12	3 48	16 5 24	23 26		16 5 09	23 27
3	2	54	17	A	8 12	3 48	17 6 25	23 23	03	17 6 10	23 24
11	23	23	18	B	8 12	3 48	18 7 26	23 19		18 7 11	22 20
			19	C	8 11	3 48	19 8 28	23 16	04	19 8 13	22 16
19	12	4	20	D	8 11	3 49	20 9 29	23 11		20 9 14	22 12
8	8	13	21	E	*Thomas* Apo.		21 10 30	22 07	05	21 10 15	22 08
16	20	54	22	F	8 10	3 50	22 11 32	22 02		22 11 17	22 03
			23	G	8 9	3 51	23 12 33	22 56	06	23 12 18	22 57
5	9	35	24	A	8 8	3 52	24 13 34	22 50		24 13 19	22 51
			25	B	*Christs* Nat.		25 14 36	22 44	07	25 14 21	22 45
13	5	44	26	C	*Stephen* Mart.		26 15 37	22 37		26 15 22	22 38
2	18	25	27	D	*John* Evangel.		27 16 38	22 30	08	27 16 23	22 31
			28	E	*Innocents.*		28 17 39	22 22		28 17 25	22 24
10	14	34	29	F	8 4	3 56	29 18 41	22 13	09	29 18 26	22 15
			30	G	8 3	3 57	30 19 42	22 05		30 19 27	22 07
19	3	51	31	A	8 2	3 58	31 20 43	22 56		31 20 28	21 58

Third Year, ☉ in Sagitar. 1671.	Suns Long D. M.	Suns Decli. D M	Diff. of Decli	Leap Year, ☉ in Sagitar. 1672.	Suns Long. D. M.	Suns Decli. D. M.		THE Foreign Account. And The Southing of the Stars just at Midnight.		
1	19 35	23 07	05	1	20 21	23 11		11	B	First in *Orion*'s girdle.
2	20 36	23 12		2	21 22	23 51		12	C	(00.35.S.
3	21 37	23 16	04	3	22 24	23 19		13	D	
4	22 38	23 20		4	23 25	23 22		14	E	(der, 44.52.N.
5	23 40	23 23	03	5	24 26	23 25		15	F	The Wagoners shoul-
6	24 41	23 26		6	25 27	23 27		16	G	*Orion*'s right shoulder,
7	25 42	23 28		7	26 29	23 29		17	A	(7.18.N.
8	26 43	23 29		8	27 30	23 30		18	B	
9	27 45	23 31		9	28 31	23 31		19	C	
10	28 46	23 32		10	29 33	23 32		20	D	
11	29 47	23 32		11	♑ 34	23 32		21	E	*Thomas* Apostle.
12	♑ 49	23 32		12	1 35	23 31		22	F	
13	1 50	23 31	01	13	2 36	23 30		23	G	
14	2 51	23 30		14	3 38	23 29		24	A	*Pollux* Foot, 16.39.N.
15	3 53	23 29	02	15	3 39	23 27		25	B	*Christs Nativity.*
16	4 54	23 27		16	4 40	23 25		26	C	*Stephen Martyr.*
17	5 57	23 24	03	17	5 42	23 21		27	D	*John Evangelist.*
18	6 57	23 21		18	6 43	23 18		28	E	*Innocents.* The great
19	7 58	23 17	04	19	7 44	23 15		29	F	Dog, 16.13.S.
20	8 59	23 14		20	8 45	23 10		30	G	
21	10 1	23 09	05	21	9 47	23 05		31	A	
22	11 2	23 04		22	10 48	23 00		1	B	JANUARY.
23	12 3	22 59	06	23	11 50	22 54		2	C	
24	13 5	22 53		24	12 51	22 48		3	D	
25	14 6	22 47	07	25	13 52	22 42		4	E	
26	15 7	22 40		26	14 54	22 35		5	F	*Twelfth Day.*
27	16 8	22 33	08	27	15 55	22 27		6	G	
28	17 10	22 25		28	16 56	22 19		7	A	First head of ♊ *Castor*,
29	18 11	22 17	09	29	17 58	22 11		8	B	(.34.N.
30	19 12	22 09		30	18 59	22 02		9	C	The little Dog, 6.5.N.
31	20 14	21 00		31	19 00	21 58		10	D	♊ head of ♊, 28.48.N.

South Declination increasing. — South Declination decreasing.

A Table of the Suns Declination for every Degree of the Ecliptick.

Degrees.	♈ ♎		♉ ♍		♊ ♐		Degrees.
	D.	M.	S.	D.	M.	S.	D.	M.	S.	
0	0	00	00	11	30	58	20	13	48	30
1	0	22	57	11	52	02	20	16	23	29
2	0	47	54	12	12	54	20	38	45	28
3	1	11	51	12	33	36	20	50	25	27
4	1	35	46	12	54	06	21	01	51	26
5	1	59	39	13	14	22	21	12	55	25
6	2	23	31	13	34	25	21	23	35	24
7	2	47	21	13	54	14	21	23	50	23
8	3	11	08	14	13	50	21	43	42	22
9	3	34	52	14	33	11	21	53	10	21
10	3	38	33	14	51	18	22	02	13	20
11	4	22	11	15	11	10	22	10	51	19
12	4	45	45	15	29	46	22	19	06	18
13	5	09	13	15	48	09	22	26	51	17
14	5	32	36	16	06	11	22	34	13	16
15	5	55	55	16	23	58	22	41	09	15
16	6	19	08	16	41	30	22	47	49	14
17	6	42	15	16	58	46	22	53	44	13
18	7	05	15	17	15	42	22	59	21	12
19	7	28	09	17	32	18	23	05	32	11
20	7	50	56	17	48	38	23	09	17	10
21	8	13	37	18	04	40	23	13	35	9
22	8	36	09	18	20	21	23	17	27	8
23	8	58	33	18	35	43	23	20	51	7
24	9	20	48	18	50	46	23	23	48	6
25	9	42	54	19	05	28	23	26	18	5
26	10	04	50	19	19	51	23	28	21	4
27	10	26	38	19	33	52	23	29	57	3
28	10	48	16	19	47	32	23	31	05	2
29	11	09	43	20	00	50	23	31	46	1
30	11	30	58	20	14	47	23	32	00	0
	♍ ♓			♌ ♒			♋ ♑			

The Use of this Table of the Suns Declination.

THe Suns greatest Declination, according to the observation of *Tycho Brahe*, and Mr. *Edw. Wright*, is 23 Deg. 31 Min. 30 Seconds; and so it was in their times, but latter Observers have found it somewhat more, so that it amounts to in these times 23 Deg. 32 Min. or very little less: and therefore I have Calculated this Table to 23 Deg. 32 Min. for those which shall desire so much exactness.

The use of this Table is thus, if you would know the Declination of the Sun, in any Deg. and Min. of the Ecliptick, first mark whether the Sign be at the head or the foot of the Table; if the Sign be at the top of the Table, then count the Deg. of the Sign downward in the first Column of the Table; but if the Sign be at the foot of the Table, then count the Deg. upward, and in the last Column of the Table, and in the common Angle, where the Character of the Sign and the Deg. thereof meets, you shall have the Suns Declination in Deg. Min. and Seconds. And here note, if the place of the Sun have both Deg. and Min. you must see what is the Difference of the Declination between the two next Degr. and by proportion allow for the odd Minutes.

Thus

Thus for Example.

The Suns place being 10 Degr. of ♉ or ♍, you ſee the Character of ♉ or ♍ are at the top of the Table: therefore find out 10 in the firſt Column, and in the ſame line under ♉, you ſhall find 14, 52, 18, that is 14 Degr. 52 min. 18 ſec. for the Declination.

But if you will know the Suns Declination, being in 10 Degr. of ♌ or ♎, then becauſe the Characters are at the bottom of the Table, you muſt count the Degr. upward in the laſt Column, and ſo againſt 10 Degr. you ſhall find 17 Degr. 48 min. 38 ſec. for the Suns Declination.

But if the Sun were in 18 Degr. 15 min. of ♉, firſt you ſee by the Table, that the 18 Degr. of ♉ hath 17 Degr. 15 min. 42 ſec. for its Declination; and the 19 deg. hath 17 deg. 32 min. 18 ſec. for its Declination; the difference between them is 16 min. 32 ſec. Then to find out by the Rule of Proportion, how much to allow for the 15 min. ſay, if 60 min. give 16 and 36 ſec. what ſhall 15 min have? And you ſhall find 4 min. 9 ſec. Then conſider by the order of the Table, whether this be to be added or ſubſtracted. In this Example, it is to be added to the foreſaid 17 deg. 15 min. 42 ſec. and ſo the Suns Declination will be 17 deg. 19 min. 51 ſec.

After this manner you may try the Tables of the Suns Declination in the *Ephemerides*; or if need be, you may rectifie them for the time to come. But in ordinary occaſions you may leave out the ſeconds, unleſs they be more then 30, and then you may add one to the min. for them.

The uſe and explanation of the former Ephemerides.

THeſe Tables are calculated only for 4 years, and neither more or leſs, becauſe the Leap-year is ſo contrived to regulate the Suns courſe, that every fifth year the Sun returns to the ſame place it was before, without any ſenſible errour for many years together. So that theſe Tables may very well ſerve for 20 years to come, only obſerving the order of the years from the Leap-year, and taking that ſection in the *Kalender* which belongs unto them.

And that theſe Tables may laſt the better, and the longer, I have calculated them now ſomewhat forwarder than they ſhould

be; they being exactly calculated for the years 1665, 1666, 1667, 1668, by which meanes they will serve these next 20 years, (*viz.*) from 1667, to 1687, without any allowance. For there will not be above 4 min. difference inthe Suns place more or less, any time these 20 years; which makes but a min. and a half of difference in the Suns Declination (even where the Declination is swiftest) and so can breed no error of danger to the Sea-man in his observations.

But if you will be so exact, that you may the better know what years these four sections of the *Ephemerides* belong unto, and the minutes which you must add or Substract to the Longitude of the Sun, to make these Tables more exact herein, observe this Table; but I would wish you not to correct the Declination at all, but rather let it alone as it is, lest for want of skill and heed you make it worse: unless you do it according to Art, by the Table of Declinations at the end of the *Ephemerides*.

First,	Second,	Third,	Leap-year.	
1657	1658	1659	1660	4 Sub.
1661	1662	1663	1664	2 Sub.
1665	1666	1667	1668	0
1669	1670	1671	1672	2 Add
1673	1674	1675	1676	2 Add

To find the Longitude and Declination of the Sun at any time, by these Tables.

First, consider whether it be the first, second, or third year after the Leap-year, (which you may know by the Table at the begining of the *Ephemerides*, or in this little Table) and accordingly look down that section which belongs thereunto, and in the Month proposed, just against the day of the Month, you shall have your desire.

Example.

If you would know the Place and Declination of the Sun the 12 Day of *April*, 1667. First, you must note the year 1667, is one of the third years from the Leap-year, and therefore you must look down in that Section for the day of the Month, and now

if

if you turn to the Month of *April*, againſt the 12 day of that Month in the aforeſaid Section, you ſhall find, that the Longitude of the Sun is 2 deg. 23 Min. of *Taurus*, and the Declination of the Sun is 12 Deg. 21 Min. of North Declination. And this is the place and Declination of the Sun, not only this day of the year, but alſo all the other years which are joyned with it in the former Table, 1659, 1663, 1671, 1675, without any ſenſible difference, eſpecially in the Declination, which is the thing moſt neceſſary for the Seamans uſe.

And thus with much facility you may know the true Longitude and Declination of the Sun at any time, which is of very great uſe for the finding of the Latitude of any place, and in working moſt other concluſions of the Sphere; as you ſhall ſee more in its place.

To know the time of the Moons Change, Full, and Quarters.

TO know the day and hour of the Conjunction and Change of the Moon, firſt look into the firſt page of the *Ephemerides*, and right againſt the date of the year, you ſhall find the *Prime* or *Golden Number*, which you muſt remember, and alſo the *Sunday* Letter for that year; then turn to the Month in which you would know the Change of the Moon, and look out the *Prime* number in the firſt Column, and by it in the ſecond Column you ſhall have the Change in hours and minutes, which hours and minutes you muſt alwayes reckon after noon: then in the third Column you ſhall have the day of the Month, and by the fourth you may know the day of the Week.

For Example.

Anno 1675, I would know the time of the New Moon in *June*; In the firſt page of the *Kalender*, I find that the *Prime* is 4, and the *Sunday* Letter *C*, then I turn to the month of *June*, and I find out the *Prime* 4, in the firſt Column, and it ſtands juſt againſt the 12 day, which by the *Sunday* Letter you may ſee is *Saturday*; now for the time of the Change this day, in the ſecond Column you find 7 hours 38 Min. which you muſt always reckon to be after noon. So that in your year 1675, it is New Moon the 12 day of *June*, and being *Saturday* at 7 of the Clock and 38 Min. Afternoon.

Here you muſt note, that if the hours and minutes of the Change be above 12, then the Change is the next day in the Morning, according to ordinary account; but this way is altogether uſed by

the Aſtronomers, who begin the day at Noon, and after a little uſe by this Table you may readily underſtand it. For firſt ——————— 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, hours after Noon, is the common reckoning. Then, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, is all one with 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, the next morning.

Or elſe ſubſtract 12 hours from the number, and the Remainer is the time of the day next morning.

Thus, the ſame year 1675, the *Prime*, being 4 in the Month of *May*, the Moon will change the 13 day, at 18 hours, 54 minutes afternoon, that is at 6 of the Clock, 54 minutes in the morning on the 14 day being *Friday*.

And thus you may find the time of the Quarters and full Moon by having the New Moon.

If you add theſe	*days.hou.min.*
For the firſt Quarter,	7 9 11
For the Full Moon,	14 18 22
For the laſt Quarter,	22 3 33
And the whole time from Moon to Moon, is	29 12 44

Thus you ſhall have the Change of the Moon and Quarters, according to her equal motion, which will be beſt, conſidering the following concluſions, though it differ a few hours from the time of the New Moon.

To know what Sign the Moon is in.

TO this purpoſe you muſt remember, that the Twelve Sines are thus numbred by Aſtrologers.

Aries, *Taurus*, *Gemini*, *Cancer*, *Leo*, *Virgo*,
0 1 2 3 4 5
Libra, *Scorpio*, *Sagittarius*, *Capricorn*, *Aquarius*, *Piſces*.
6 7 8 9 10 11

Now at the Change, the Sun and Moon are both in one Sign and Degree, which in the former Example of the New Moon the 12 of *June* is 1 Degr. of *Cancer*, for that is the place of the Sun, according to the *Ephemerides*, the which you muſt ſet down thus, ——3 Sign 1 Deg. 4 min.

A Table shewing the Moons motion in Signs, Degr. and Min. for every day and hour of her age.

The days of the Moons age.	S.	D.	M.
1	0	13	11
2	0	26	21
3	1	9	32
4	1	22	42
5	2	5	53
6	2	19	3
7	3	2	14
8	3	15	25
9	3	28	35
10	4	11	46
11	4	24	56
12	5	8	7
13	5	21	18
14	6	4	28
15	6	17	39
16	7	0	49
17	7	14	0
18	7	27	11
19	8	10	21
20	8	23	32
21	9	0	42
22	9	19	53
23	10	3	3
24	10	16	14
25	10	29	25
26	11	12	35
27	11	29	46
28	0	8	56
29	0	22	7
30			

The hours of the Moons age.	D.	M.
1	0	33
2	1	6
3	1	39
4	2	12
5	2	45
6	3	18
7	3	51
8	4	24
9	4	56
10	5	29
11	6	2
12	6	35
13	7	8
14	7	41
15	8	14
16	8	47
17	9	20
18	9	53
19	10	26
20	10	59
21	11	32
22	12	5
23	12	38
24	13	11

NOw by this Table, knowing the age of the Moon since the Change, you may see how much must be added to the place of the Moon that she then was in, and if it shall come to more Signs than 12, you must cast 12 away, and that which remains, will shew the Sign, Degree, and Minute the Moon is in.

For Example.

Suppose you would know the Moons place the 19 of *June*, at Noon *Anno* 1675, the Change was the 12 day, at 8 Hours at Night. Therefore the 19 day at Noon, the Moon is 6 days and 16 hours old.

Now the place of the Sun and Moon at the Change was, as was shewed before,

	Sig	*Deg.*	*Min.*
	3	1	0
The Moons motions for 6 Days is ——	2	19	3
And for 16 hours,	0	8	47
The sum is	5	28	50

That is, in 28 Deg. 50 m. of *Vir.*

Or else you may multiply the Moons age by 2, and divide the Product by 5, and the Quotient will

A Table shewing the time of the Moons coming to the South by her age.

The days of the Moons age.	Afternoon. H.	Afternoon. M.	The hours of the Moons age.	Min.
	10	49	1	2
	21	38	2	4
	32	26	3	6
	43	15	4	8
	54	3	5	10
	64	53	6	12
	75	41	7	14
	86	30	8	16
	97	19	9	18
	108	8	10	20
	118	56	11	22
	129	45	12	24
	13 10	34	13	26
	14 11	23	14	28
	15 12	11	15	30
	16	—	16	32
	17 1	10	17	34
	18 1	49	18	36
	19 2	38	19	38
	20 3	26	20	40
	21 4	15	21	43
	22 5	3	22	45
	23 5	53	23	47
	24 6	41	24	49
	25 7	30		
	26 8	19		
	27 9	8		
	28 9	59		
	29 10	45		
	30 11	34		

Morning.

will shew you how many Signs, and the remainder so many times six Degrees as the Moon is gone from that Sign and Degree, where the Sun is at that present time.

The Use of this Table is such.

KNowing as before, the time of the New Moon, you may easily know her age any day at Noon in days and hours.

Then see what time is allowed for the Dayes, and after for the odd Hours, and add them together; lastly, see how many minutes is to be allowed for this time, and the sum of all will be the time of the Moons comeing to the South.

Example.

Suppose the Moon be any day at Noon 10 Dayes and 8 Hours old, the Tables will shew first.

For the 0 Day 8 Hours 8 Min.
For 8 Hours 0 16
which is 8 24
Now 8 Hours 24 Min. requires 0 17

All which is the time 8 41 —— of the Moons coming to the South.

Or

Or elſe you may do this by the Inſtrument, page the 9, thus: Turn the moveable Circle, ſo that the age of the Moon may be upon the North or South point of the Compaſs, and the Index will ſhew the time of the Moons coming to the South.

Or elſe by *Arithmetick*, multiply the Moons age by 12, and divide the Product of 15, ſo the Quotient will ſhew the hour of the Moons coming to the South; and if any thing remain, multiply it by 4, and that will ſhew the minutes to be added to the hours of the Quotient, and ſo you ſhall have the time of the Moons coming to the South.

This knowledge of the Moons coming to the South, is very neceſſary for many purpoſes; For firſt, hereby you may know the time of high Tyde at any place, as is ſhewed before.

Secondly, knowing the time of the Moons coming to the South, you may know the time of the night by the ſhining of the Moon upon a Sun-Dial. Thus:

Obſerve by a Sun-Dial, as if you would ſee what a clock it were by the Moon, and obſerve how much the ſhadow of the Moon doth either lack or is paſt the 12 upon the Dial: for ſo much it doth want of, or is paſt the time of the Moons coming to the South.

For Example.

Suppoſe as before, the Moon did come to the South at 8 hours 41 Min. Afternoon, and the ſhadow of the Moon upon the Dial were at 10, this wants 2 hours of 12: and therefore it wants 2 hours of 8 hours 41 min. ſo that it is ſix of the clock and 40 min. But if the ſhadow of the Moon had been at 2 upon the Dial, then you muſt have added 2 hours to the Moons coming to the South, and ſo it had been 10 hours 41 min. at night.

Again, by the time of the Moons coming to the South, and the place of the Moon in the *Zodiack*, you may know the time of the Moons riſing and ſetting, as thus, knowing what Sign and Degree the Moon is in, as before, look out when the Sun is in that Sign and Degree in the *Ephemerides*, and right againſt it in the proper column, you ſhall find the time of the Suns ſetting, when the Sun is in that ſign and degree, this time is half the diurnal Arch belonging to that ſign and degree of the *Ecliptick*, which being added to the time of the Moons being South, it will ſhew the time of the Moons ſetting; and if you Subſtract it from the Moons being South, it will ſhew her riſing.

Example

For Example.

Suppoſe the Moon be in 10 Degrees of *Taurus*, and the time of her coming to the South at 10 of the Clock at Night. Firſt, I look when the Sun is in 10 degrees of *Taurus*, and that is the 20 of *April*, and the time of the Sun-ſet that day is 7 hours, 18 min. this added to 10 hours, the time of the Moons being South, is 17 hours, 18 min. which is five of the Clock, and 18 min. next morning, for the time of the Moons ſetting; likewiſe this ſubſtracted from 10 hours, there remains 2 hours 42 min. the time of the Moons riſing.

To find the length of the day and Night.

In the fifth Column of the *Kalender* (among the fixed *Feaſts*) you have the time of the Suns riſing and ſetting, by which you may know the length of the Day and Night: for the hours and min. of the Suns riſing being doubled, gives the length of the Night, and the hours and minutes of the Suns ſetting being doubled, gives the length of the day.

How to uſe the ſuns Declination, thereby to find out the Elevation of the Pole.

TO find out the Altitude or height of the Pole in any ſeveral Latitude, *viz.* How much the Pole is raiſed above your Horizon in degrees and minutes. It is neceſſary, firſt, to take by obſervation the meridian Altitude of the Sun, which meridian Altitude is known, by taking the height of the Sun that day, in which you would obſerve, juſt at noon, at which time the Sun is higheſt, being then alſo upon the Meridian: which found, note it dowm in paper or ſlate: then knowing the year of our Lord, with the Month in which you are, and alſo the day of the month, look in the *Kalender* before ſpoken of, for the month and day thereof, and right againſt the ſaid day of the month, towards the right hand, under the title *Suns Dec.* you ſhall ſee the ſeveral years, which the ſaid Table of Declination ſerves for. If it be the Leap-year, look in the laſt of the ſaid 4 Tables under the title *Leap-year*: If it be the 1 after *Leap-year*, then reſort to the firſt of the ſaid Tables under the title *Firſt*; and ſo of the ſecond and third, and after thoſe 4 years are paſt, come back again to the firſt, and proceed as you did before: then (as I ſaid) having found out the month, day, and year, direct your eye downward toward the foot of the table, in the table which ſerves for the year purpoſed, till you find a number making a right angle with the day of your month: or more plainly, look what number in the laſt column of your year is right againſt the day of your month, which

numbers

numbers are the Decli. for the day desired: and there being 2 numbers in the said Column; the first are Deg. the other Min. then regard also whether the Sun hath N. Declination, or S. Declination, which is set down between the several spaces: where by the way you shall note, that from the Suns entrance into *Aries*, which is about the 11*th* of *March*, till his entrance into *Libra*, which is about the 13*th* of *September*, he hath N. Declination, and from the said 13 of *September* till his entrance into *Aries* again, S. Declination: the said Declination increasing according to the Suns progress through the Signs from his entrance into *Aries*, till his entrance into *Cancer*, and decreasing from *Cancer* to the beginning of *Libra*, then again increasing from *Libra* to *Capric.* and decreasing from *Capricorn* to the end of *Pisces*, and beginning of *Aries*, *Aries*, *Taur. Gem. Canc. Leo*, and *Virgo*, be Signs having N. decli. from the Equinoctial Circle: and *Libra*, *Scorp. Sag. Capr. Aqu.* and *Pis.* S. Signs having such decli. from the Circle: then knowing (as I have said) the Merid. Altit. of the Sun, the decli. of the Sun, and whether the Sun hath S. or N declination; as these three things are always to be considered in knowing the height of the Pole. If the declination be N. Substract the decli. from the Merid. Altitude, the remainer is the Elevation of the Intersection, or cutting of the Equinoctial with the Merid. above the Horizon: which in common terms is the Elevation of the Equinoctial above the Horizon: which height of the Equinoctial taken from 90, leaveth the height of the Pole, or the Latit. of the place of your Observation. But contrariwise, if the Sun hath South decli. add the said decli. to the Merid. Altitude, the Product is the height of the Equinoctial, which likewise taken from 90, leaveth the height of the Pole.

Example.

I observed the 11 of *July* 1660. in the City of *London*, and found the Merid. Altit. of the Sun to be 62 deg. and the declination of the Sun N. 23 deg. 32 min. Now being that the decli. was N. I substracted it from the height of the Sun at Noon: the remainer was 38 deg. 28 min. the height of the Equi. that taken from 90, leaves 51 deg. 32 min. for the height of the Pole, or Latitude of *London*.

This Rule is to be understood when you are between the Equi. and the N. Pole and the Sun to the Southwards of you: But if you should be between the Equinoctial and the South Pole, and the Sun North from you; then you must work contrary: for then if the Sun

hath *South* Declination, you muſt ſubſtract the Declination from the Meridian Altitude; and if the Sun hath *North* Declination, you muſt add the ſaid Declination to the Meridian Altitude.

As for Example.

Being at Sea to the Southwards of the Line the 4 of *January*, 1660. ſuppoſe you obſerve the height of the Sun at noon, and find it to be 66 deg. 24 min. then you ſhall find the declination to be 21 deg. 20 min. to the Southwards, which ſubſtracted from 66 deg. 24 min. the Meridian Altitude leaves 45 deg. 4 min. for the height of the Equinoctial: that taken from 90, reſts 44 deg. 56 min. for the height of the South Pole above the Horizon.

Again, ſuppoſe that being at Sea the 10 of *May* 1660. and obſerving the Sun, you take the Altitude at noon 60 deg. 30 min. and his declination then is 20 deg. 15 min. Norrhwards, but then not having obſerved long before you know not whether you are to the Northwards of the Equinoctial, or to the Southwards of the line: to know which, ſet the Sun by your Compaſs, and mark which way the ſhadow of the Sun ſtreeketh; for if he caſteth his ſhadow the ſame way that the declinat. is, then is the Sun betwixt the Equinoctial and you, your ſelf being alſo the ſame way that the Suns declination is, and therefore ſubſtracting the declinat. 20 deg. 15 min. from 60 deg. 30 min. the Meridian Altitude reſts 40 deg. 15 min. the height of the Equinoctial, the complement whereof 49 deg. 45 min. is the Elevation of the North Pole: but if the Sun caſts his ſhadow contrary to his declination, that is to ſay, it having North declination, his ſhadow goeth Southward; or having South declination, it caſts his ſhadow Northwards: Then either the Equinoctial ſhall be betwixt you and the Sun, or you in the Equinoctial; or elſe you ſhall be betwixt the Equinoctial and the Sun: which to know, add the Declinatiou and the Meridian Altitude for the day propoſed together: if the ſum of the addition be leſs than 90 deg. ſo much as it wanteth of 90 deg. ſhall you be diſtant from the Equinoct. that way that the ſhadow ſtreeketh: If it be juſt 90 deg. then are you under the Equinoctial. Again, if your ſaid Meridian altitude and declination added, paſſeth 90 deg. then ſo much as is overplus you ſhall be from the Equinoctial towards the Sun, and then alſo ſhall you be between the Equinoctial and the Sun; and if you find the Sun to be in your *Zenith*, ſo much as is the declination ſhall you be from the Equinoctial that way that the Sun declineth: By which

reaſon, if the Sun be in your *Zenith*, that is 90 deg. high, and hath no Declination, then are you under the Equinoctial.

How to appropriate the Tables of Declination to any other Meridian.

THere is in the oft uſing of the Suns Decli. one principal thing to be conſidered, which is, that a Table of Declination made for any particular place, doth not ſerve generally for all places, but only for ſuch places as have the like, or near the ſame Longitude. The reaſon is, becauſe that the Declination is calculated according to the true place of the Sun at Noon, at which time the Sun is upon the Meridian at that place, for which the ſaid Tables are made: but you muſt note, that the Sun doth not come to the Merid. in all places at a like time, although that in all places the Sun being upon the Merid. makes the middle of that day. But for every 15 deg. difference of Long. between any 2 places, the Sun comes ſooner or later to the Meridian, by ſo many hours. So that if a place be 15 deg. to the Eaſtward of the place prefixed, then the Sun comes ſooner to the Merid. by an hour; and if it be 15 degrees to the Weſtwards later by an hour. And ſo conſequently more or leſs, according to the difference of Longitude. By which reaſon, in what part of the world ſoever you be, you may work for the declination of the Sun in that place by the proportional parts of 24 hours declination to the hours of the difference in Longitude.

Exam. Being in *Braſilia*, (a part of the *Weſt-Indies*,) the 10 of *April*, 1660. whoſe Merid. is diſtant from the Merid. of *England* to the weſtward about 45 d. which is 3 hours of time, that the Sun ſhould come to the Meridian later there than at *London* where the Table is made: For when it is 12 a clock here, it is but 9 there; and being noon there it is 3 a clock here. Therefore to apply this Table to that place, I find the declination for the day aforeſaid, under one Merid. to be 11 d. 55 m. at noon, and by reaſon that when it is 12 a clock in *Braſilia*, it is then at *London* 3 hours paſt. Therefore by the Rule of proportion, I ſeek what declination the Sun hath at 3 a clock in the afternoon, as followeth; I take the difference of the Declination between the day aforeſaid, and the next following, which is 20 min. then I ſay, by the Rule of 3, if 24 hours give 20 min. what gives 3 hours, the time of the difference in Longitude? *Facit* 2 min. and 30 ſeconds, which (becauſe the Declination increaſes) I add to the number of the day propoſed: ſo I conclude, the Declination of the Sun to be the 10 of *April* at noon in the Kingdom of *Braſilia*, 11 deg. 57 min. and a half.

Again, the day and time aforesaid in the Bay of St. *Sebastian*, whose Long. is 5 deg. to the Eastward of *London*, answering near to four hours of time, shewing that the Sun comes sooner to the Merid. in the Bay of St. *Sebastian*, by 4 hours than at *London*, by which reason the Declination is less there than at *London*, because the Declination doth increase: For if the Declination did increase, it would be more there than at *London*; and to know the Declination of the Sun in the Bay aforesaid, I take the difference betwixt the Declination of the 10*th* of *April*, and the Declination of the day next before, being 20 minutes. Then (I say) if 24 hours give 20 min. what 4 hours? *Facit* 3 min. 20 sec. which deducted from 11 deg. 55 min. the Declination of the Sun the 10*th* of a *April* aforesaid at *London*, leaves 11 deg. 51 min. 40 sec. The Declination of the Sun at noon in the Bay of St. *Sebastian*, being that when it is 12 of the clock there, it is but 8 of the clock at *London*, or in any place having the same Long. Because this appropriating of the Declination, to any other Merid. is so necessary; I have first in the Kalender, set down the daily difference of the Declination between the two sections in either page, which will indifferently serve for both; and I have also added this Table of *Proportion*, for your more ready finding how much you must add to, or substract from the Declination in the Kalender The work is the same as in the former Example, only this Table will save you labour in working by the Rule of Three, and so needs no farther Example.

A Table to proportion the Suns Declination to any time of the day, or to any other Meridian. The daily difference of the Declination being,

The Hours from Noon, Or difference of Meridian, E. or W.	Minutes.	2	4	6	8	10	12	14	16	18	20	22	24
		′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
	1	5	10	15	0 20	0 25	1 30	0 35	0 40	0 45	0 50	0 55	1 00
	2	10	20	30	0 40	0 50	1 00	1 10	1 20	1 30	1 40	1 50	2 00
	3	15	30	45	1 00	1 15	1 30	1 45	2 00	2 15	2 30	2 45	3 00
	4	20	40	1 00	1 20	1 40	2 00	2 20	2 40	3 00	3 20	3 40	4 00
	5	25	50	1 15	1 40	2 05	2 30	2 55	3 00	3 45	4 10	4 35	5 00
	6	30	1 00	1 30	2 00	2 30	3 00	3 30	4 00	4 30	5 00	5 30	6 00
	7	35	1 10	1 45	2 20	2 55	3 30	4 05	4 40	5 15	5 50	6 25	7 00
	8	40	1 20	2 00	2 40	3 20	4 00	4 40	5 20	6 00	6 40	7 20	8 00
	9	45	1 30	2 15	3 00	3 45	4 30	5 15	6 00	6 45	7 30	8 15	9 00
	10	50	1 40	2 30	3 20	4 10	5 00	5 50	6 40	7 30	8 20	9 10	10 00
	11	5 55	1 50	2 45	3 40	4 35	5 30	6 25	7 20	8 15	9 10	10 05	11 00
	12	0 0	2 00	3 00	4 00	5 00	6 00	7 00	8 00	9 00	10 00	11 00	12 00

How to observe the height of the Pole by the Stars.

THe working thereof by the Stars to find the height of the Pole, is all alike with the working thereof by the Sun; for if you observe any Star upon the Merid. look in the Table of fixed Stars for the name of the Star which you observed, where you shall find his Declination either North or South, and the right Ascension thereof in deg. and hundred parts, and having taken the Altit. of any Star upon the Merid. you have nothing to mark in the Table for this, but the Declination, which if it be North, take the Declination of the Star from the height thereof: The Remainer taken from 90, leaveth the height of the Pole: But if the Star hath South Declination, add the Declination to the Altitude taken, and the Product thereof taken from 90, leaves the height of the Pole: Also to find the time of any Stars coming to the Merid. is set down after the Tables of the Suns right Ascension; but for the first day of every Month, you have it in the Table of the Stars.

Example.

The 25 of *November*, I observed a Star of the second bigness in the wing of *Pegasus*, or the *Flying Horse*, about 8 of the clock in the Evening, and found the Merid. Altitude thereof to be 51 deg. 52 min. and in the Table of the fixed Stars, I find the said Star to have 13 deg. 24 min. North Declination: Which taken from 51 deg. 45 min. the height observed, leaves 38 deg. 28 min. the height of the Equinoctial, the Complement whereof 51 deg. 32 min. is the height of the North Pole at *London*.

And so consequently for all those Stars whose Declination is taken from the Equinoctial: But for those Stars which are any thing near to the Pole, whose distance or declination is counted from the Pole, their working is thus: You must note, that that being far to Northwards, some of those Stars will be twice upon the Merid. *viz.* once above the Pole, and once under the Pole: Therefore if you observe any Star upon the Meridian under the Pole, add the distance of the said Star from the Pole to your Altitude observed, the totall is the height of the Poe: But if you observe any Star upon the Meridian above the Pole, so much as is the distance or declination of the said Star from the Pole, you must take from the Altitude taken, the remainer is the height of the Pole.

As for Example.

If at *London* you obſerve the former *Guard Star* beneath the Pole upon the Meridian, you ſhall find it to be 37 deg. 16 min. to which if you add 14 deg. 22 min the diſtance of the ſaid Star from the Pole, the total is 51 deg. 32 min. the height of the North Pole at *London*. Again, the ſame Star obſerved upon the Meridian above the Pole, is 65 deg. 54 min. from which 14 deg. 22 min. the diſtance aforeſaid taken, leaveth 51 deg. 31 min. as before.

Note, that being far Northward, thoſe Stars between the Equinoctial and Tropick of *Cancer* are beſt to obſerve; and being between the ſaid Tropick and the Equinoctial, thoſe Stars above the Pole are fitteſt for obſervation; and for thoſe that travel far beyond the Line to the Southwards, the like order muſt be kept by the Stars between the Equinoctial, and the Tropick of *Capricorn*, and thoſe that are near the South Pole.

Of the North Star.

WHereas the North Star being very near the Pole, and (by report) is of moſt Sea-men made uſe of for obſervation in our Northern Navigation, conſidering the great uſe that hath been made thereof, there hath formerly been 2 Tables ſet forth for this purpoſe; the one after a more general way, as ſuppoſing little or no difference in any Latitude; the other with ſome allowance for the difference of the height of this Star in ſeveral Latitudes; which though it be not much, for it is but 3 min. in the Latitude of 40 deg and but 4 min. in the Latitude of 50 deg. and but 6 min. in the Latitude of 60 deg. (which is as far as theſe obſervations can well be uſed) yet this difference is not to be neglected, and therefore here I have joyned both the Tables in one, having corrected them according to the true Declination of this Star from the Pole, for the year 1660, which is 2 deg. 30 min.

But herein take ſpecial notice, how you muſt reckon theſe points of Compaſs which in the old Tables was not well directed, for they reckon the points of the Compaſs upon their Nocturnals, juſt as they are in the Figures of the Compaſs *pag. 9.* which though it ſhews the true poſition of them, as it lies flat, yet is very falſe and abſurd when the Inſtrument is held up for obſervation.

Therefore in this Table I begin at that part of the Meridian which lies directly under the Pole, which may moſt properly be called the North, and ſo proceed point by point, as the Guard and the other Stars make their revolution about the Pole, aſcending from this loweſt or North

North point of the Meridian, to the Northeaſt, and ſo to the Eaſt, and from thence to the Southeaſt, and ſo to the S. or higheſt point of their aſcending, being directly over the Pole: From this South or higheſt point they deſcend again by the W. and ſo return to the North again.

Yet becauſe ſome have ſcrupled hereat, being uſed to the other way, I have alſo in the laſt Column ſet the points of the Compaſs according to the old way, ſo that you may uſe which you find beſt.

Laſtly, take this as a general uſe to guide you, and to prevent miſtakes, that the firſt of the Guards of the little Bear which is the Star you are to obſerve, is almoſt in oppoſition to the Pole Star: ſo that when the Guard Star is under the Pole, then the Pole Star is above the Pole; and when the Guard Star is above the Pole, then the Pole Star is under the Pole ſo many degrees and minutes as the Table ſhews you.

The uſe of the Table is thus, when you would obſerve the altitude of the N. Star, mark as near as you may (or rather obſerve with a Nocturnal made on purpoſe,) upon what point of the Compaſs the former Guard of the little Bear is (reckoning the points of the Compaſs thereon, according to the foreſaid rules,) and if the ſaid Star be not juſt upon a full point of the Compaſs, then ſtay a little longer, till it come to ſome one of them, and then obſerve the height of the Pole Star as exactly as you can. Then by the way of your Ship, knowing within a deg. or two what Latit. you are in, conſider which of theſe Latit. ſet down in the top of the Table, is that which you are neareſt to, and uſe that. And now if you find the point of the Compaſs which the Guard Star is upon, in the firſt Column of the Table, in that very line under the Column of your Latitude you ſhall find how many deg. and min. the Pole Star is either above or below the Pole, according to the direction of the laſt Column of the Table, which you muſt make uſe of. If the Star be any thing above the Pole, ſubſtract the number in the Table, from the height of the Star obſerved: but if the Star be under the Pole, then add the number found in the Table to the height obſerved, and ſo you ſhall have the true height of the Pole.

Thus (if without having any reſpect to the Latit.) you ſhall ſee the Guard Star to be juſt Northeaſt from the Pole Star, and by obſervation find the height thereof to be 50 deg. 0 min. look out this point Northeaſt in the Table, and againſt it in the next Column marked (0) Latit.) you ſhall find that the Star is 0 deg. 39 min. above the Pole, and this now ſubſtracted from the foreſaid height 50 deg. there reſts 49 deg. 21 min. for the height of the Pole.

But

But if you will be more exact, and have reſpect to the Latitude which you are in, which you may ſuppoſe to be about 50 deg. then look in this line of Northeaſt for the Colume under 50, and there you ſhall find that the Pole Star is only 35 min. above the Pole, and this ſubſtracted from the foreſaid height of 50 degr. ſhews the true Latitude to be 49 deg. 25 min. which differs 4 min. from the former, and is ſo much the more exact.

But if the Guard Star had been Southweſt, then the Pole Star had been 30 min. (or more exactly) 44 min. under the Pole, which being added to the height 50 deg. the Latitude ſhould be 50 deg. 39 min. or more exactly 59 deg. 44 minutes.

And now having made plain unto you the uſe and profit of the ſaid Table, it being indeed ſo neceſſary and commodious for the Mariners uſe as any rule whatſoever: It reſteth now to ſpeak ſomewhat more particularly of the other fixed Stars ſet down in the Table following, wherein are in the firſt page 12 colums, the firſt is the number of the Stars which are 65, the ſecond is their *Names*, the third is their *Magnitudes*, either the firſt, ſecond, or third Magnitudes, the fourth is their *Right Aſcenſions* in degrees and hundred parts, the fifth is the *Difference* of their *Right Aſcenſions*, for 100 years, the ſixth is their *Declination* in deg. and min. the ſeventh is the name of their *Declination*, S. ſignifying *South*, and *N.* ſignifying *North*, the eighth is their *Difference* of their *Declination* for 100 years, the ninth ſheweth whether their difference of Declination be to be added or ſubſtracted, *A* ſignifying to add, and S to ſubſtract, in the tenth their Right Aſcention in hours and 100 parts for the knowing the hour of the night at any time: In the two laſt Columns, and ſo along over the ſecond page at the top of the Column, are the names of the Twelve Months, and under them in the Columns of every Month are the Hours, and hundred parts of an Hour, that any of theſe Stars come to the *Meridian* the firſt day of every Month, the letter *M.* ſheweth the hour to be between Midnight and Noon, & the letter *N.* ſheweth the hour to be between Noon and Midnight. Next after the Table of the *Stars*, follows a Table of the Complement of the Suns *Right Aſcenſion* in hours and hundred parts, the uſe of which Table follows after the Tables.

A Table of the North Star.

In these several Latitudes.

The true Point of the Compass.	0	20	30	40	50	60	70	The old way of reckoning the Points of the Compass.
	D. M.	D. M.	D. M.	D. M.	D. M.	D. M.	D. M.	
North	2 10	2 10	2 10	2 09	2 9	2 8	2 7	*South.*
N by *E*	1 53	1 53	1 53	1 52	1 55	1 51	1 49	*S* by *E*
N N E	1 31	1 31	1 30	1 30	1 29	1 28	1 25	*S S E*
n e by *n*	1 6	1 5	2 4	1 0	1 02	1 1	0 58	*S E* by *S*
N E	0 39	0 37	0 36	0 36	0 35	0 33	0 30	*S E*
n e by *e*	0 10	0 9	0 8	0 7	0 06	0 4	0 1	*S E* by *E*
E N E	0 18	0 19	0 20	0 21	0 22	0 23	0 26	*E S E*
E by *N*	0 49	0 50	0 50	0 51	0 52	0 53	0 56	*E* by *S*
East.	1 15	1 15	1 16	1 17	1 18	1 19	1 21	*East.*
E by *S*	1 38	1 39	1 39	1 40	1 41	1 42	1 44	*E* by *N*
E S E	2 0	2 0	2 0	2 00	2 01	2 2	2 2	*E N E*
S E by *E*	2 15	2 15	2 15	2 15	2 16	2 16	2 16	*n e* by *e*
S E	2 25	2 25	2 25	2 25	2 25	2 25	2 25	*N E*
S E by *S*	2 30	2 30	2 30	2 20	2 30	2 30	2 30	*n e* by *n*
S S E	2 29	2 29	2 29	2 29	2 29	2 29	2 29	*N N E*
S by *E*	2 22	2 22	2 22	2 22	2 22	2 22	2 22	*N* by *E*
South.	2 10	2 70	2 10	2 11	2 11	2 11	2 12	*North.*
S by *W*	1 58	1 53	1 54	1 53	1 35	1 55	1 57	*N* by *W*
S S W	1 31	1 32	1 32	1 33	1 34	1 35	1 38	*N N W*
s w by *s*	1 7	1 7	1 8	1 10	1 10	1 11	1 13	*n w* by *n*
S W	0 39	0 40	0 41	0 40	0 43	0 47	0 44	*N W*
s w by *w*	0 10	0 11	0 12	0 13	0 14	0 19	0 16	*n w* by *w*
W S W	0 19	0 18	0 17	0 16	0 15	0 13	0 10	*W N W*
W by *S*	0 43	0 47	0 46	0 45	0 44	0 43	0 42	*W* by *N*
West	1 15	1 14	1 13	1 12	1 11	1 10	1 8	*West.*
W by *N*	1 39	1 39	1 38	1 37	1 36	1 35	1 33	*W* by *S*
W N W	2 00	1 59	1 59	1 58	1 58	1 57	1 56	*W S W*
n w by *w*	2 15	2 15	2 14	2 14	2 14	2 13	2 12	*s w* by *w*
N W	2 25	2 25	2 25	2 25	2 25	2 24	2 24	*S W*
n w by *n*	2 30	2 30	2 30	2 30	2 30	2 30	2 30	*s w* by *s*
N N W	2 29	2 29	2 29	2 29	2 29	2 29	2 29	*S S W*
N by *W*	2 22	2 22	2 20	2 20	2 22	2 21	2 21	*S* by *W*

If the former of the Guards be afcending from the North or lower part of the Meridian.

If the former of the Guards be defcending from the South or upper part of the Meridian.

Of Decima. Above the Pole. Under the Pole. Above the Pole.

The *Right Aſcenſion* and *Declination* of 65 of the principal every Month, with the difference of their

Number.	For the Year 1666. *Names.*	Magnitude.	Right Aſcenſion.	Diff. 100 year.	Declination.	N or S	Diff. 100 year	Right aſcenſion.	January.	February.
			D. pts.	d.pt.	*D. M.*		M	H.pts.	H.pts. Λ	H.pts. Λ
1	North in Whales tayl.	3	00 60	1 30	10 41	S	34 S	0 04	4 48	2 34
2	South in Whales tayl.	2	06 62	1 27	19 51	S	34 S	0 44	4 88	2 74
3	Pole Star. (Girdle	2	08 19	1 82	87 30	N	34 A	0 55	4 90	2 76
4	South in *Andromeda*'s	2	12 67	1 39	33 58	N	33 A	0 84	5 29	3 15
5	In *Caſſiopeia*'s knee.	3	16 02	1 58	58 27	N	33 A	1 07	5 50	3 36
6	South in Rams horn	3	23 77	1 38	17 38	N	31 A	1 58	6 03	3 88
7	North in Rams horn	3	23 98	1 37	19 09	N	31 A	1 60	6 03	3 89
8	Rams head.	3	27 07	1 42	21 51	N	30 A	1 80	6 23	4 09
9	Brighteſt in Whales jaw	2	41 17	1 25	02 44	N	25 A	2 75	7 18	5 04
10	Head of *Meduſa*.	2	41 60	1 61	39 37	N	25 A	2 77	7 21	5 07
11	*Perſeus* right ſide.	2	44 92	1 47	48 35	N	21 A	2 99	7 45	5 29
12	After in *Perſeus* left foot	3	53 29	1 57	30 52	N	20 A	3 55	7 99	6 85
13	Bulls Eye.	1	64 15	1 45	15 47	N	10 A	4 28	8 72	6 57
14	The Goat, *Hircus*.	1	72 75	1 81	45 36	N	10 A	4 85	9 29	7 15
15	*Orions* left foot.	1	74 62	1 25	08 37	S	09 S	4 97	9 40	7 26
16	*Orions* left ſhoulder.	2	76 77	1 35	06 00	N	07 A	5 12	9 55	7 41
17	Firſt in *Orions* Girdle.	2	78 74	1 28	00 35	S	07 S	5 25	9 66	7 52
18	Wagons right ſhoulder	2	83 82	1 92	44 52	N	04 A	5 59	10 35	8 21
19	*Orions* right ſhoulder.	2	84 27	1 37	07 18	N	04 A	5 62	10 07	8 91
20	Brighteſt in *Pollux* feet.	2	94 52	1 47	16 39	N	02 S	6 30	10 74	8 60
21	Great Dog (*Caſtor*	1	97 55	1 14	16 13	S	04 A	6 50	10 94	8 80
22	Firſt head of *Gemini*	2	108 20	1 74	32 34	N	11 S	7 21	11 65	8 51
23	Little Dog.	1	110 42	1 35	06 05	N	12 S	7 36	11 80	8 66

Fixed Stars, and their coming to South the first day of *Right Ascension* and *Declination* for 100 years.

Marc.		April.		May		June.		July.		Aug.		Sept.		Octo.		Nov.		Dec.		Number.
H.	pts.	H.	pts.	H.	pts.	H.	pts.	H.	pts.	H.	pts.	H.	pts.	H.	pts.	H.	pts.	H.	pts.	
	A		M		M		M		M		M		M		A		A		A	
0	57	10	69	8	81	6	72	4	65	2	62	0	72	10	91	8	92	6	78	1
0	97	11	09	11	09	7	12	5	05	3	02	1	12	11	31	9	32	7	18	2
0	99	11	11	11	11	7	14	5	07	3	04	1	14	11	53	9	34	7	20	3
1	38	11	50	11	50	7	53	5	46	3	43	1	53	11	33	9	73	7	59	4
1	59	11	1	11	1	7	74	5	67	3	64	1	74	11	93	9	97	7	80	5
			A												M					
2	11	0	23	10	35	8	26	6	19	4	16	2	26	0	46	10	46	8	32	6
2	12	0	24	10	36	8	27	6	20	4	17	2	27	0	46	10	47	8	33	7
2	32	0	44	10	56	8	47	6	40	4	37	2	47	0	66	10	67	8	53	8
3	27	1	39	11	51	9	42	7	35	5	32	3	42	1	61	11	62	9	48	9
3	30	1	42	11	54	9	45	7	38	5	35	3	45	1	64	11	65	9	51	10
3	52	1	64	11	76	9	67	7	60	5	57	3	67	1	86	11	67	9	73	11
					A												M			
4	08	2	20	0	32	10	23	8	16	6	13	4	23	2	42	0	43	10	29	12
4	80	2	92	1	04	10	95	8	88	6	87	4	95	3	14	1	15	11	01	13
5	38	3	50	1	62	10	53	9	46	7	43	5	53	3	72	1	73	11	59	14
5	40	3	61	1	73	11	64	9	57	7	54	5	64	3	83	1	84	11	70	15
5	54	3	76	1	88	11	79	9	72	7	69	5	79	3	98	1	99	11	85	16
5	79	3	87	1	89	11	90	9	83	7	80	5	90	4	09	2	10	11	56	17
							A												M	
6	44	4	56	2	68	0	59	10	52	8	49	6	59	4	78	2	79	0	65	18
6	14	4	26	2	38	0	29	10	22	8	19	6	39	4	48	2	49	0	35	19
6	83	4	95	3	07	0	96	10	98	8	88	6	98	5	17	3	18	1	04	20
7	03	5	15	3	27	1	18	11	11	9	08	7	18	5	37	3	38	1	24	21
7	74	6	86	3	98	1	89	11	82	9	79	7	89	6	08	4	09	1	91	22
7	89	6	91	4	13	2	04	11	97	9	94	8	09	6	23	4	42	2	10	23

The *Right Aſcenſion* and *Declination* of 65 of the principal every Month, with the difference of their

Number.	For the Year 1660. *Names.*	Magnitude.	Right Aſcenſion.	Diff. 100 year.	Declination.	N or S	Diff. 100 year	Right aſcenſion.	January.	February.
			D. pts.	d.pt	D. M.		M	H.pts.	H.pts. A M	H. pts. A
24	Second head *Gem. Caſtor*	2	111 17	1 59	28 48	N	12 S	7 41	11 84	9 77
25	Souther. Arm, the Crab	2	12997	1 39	13 8	N	22 S	8 66	1 10	10 96
26	*Hydraes* Heart	1	13777	1 25	7 12	S	25 A	9 18	1 62	11 46
27	Lyons heart.	1	14759	1 37	13 36	N	29 S	9 84	2 27	0 13
28	Lyons Neck, higheſt.	2	14943	1 47	25 5	N	29 S	9 96	2 35	0 21
29	Great Bears ſide.	2	16017	1 62	58 12	N	32 S	10 68	3 11	0 97
30	Great Bears back.	2	16064	1 67	63 35	N	33 S	10 71	3 14	1 00
31	Lyons back	1	16403	1 45	22 22	N	34 S	10 94	3 36	1 22
32	Lyons tayl.	1	17295	1 33	16 28	N	34 S	11 53	3 97	1 83
33	Great Bears thigh.	2	17389	1 38	55 36	N	34 S	11 60	4 3	1 89
34	Firſt in Ravens wing.	3	17988	1 3	15 37	S	34 A	11 99	4 43	2 19
35	Firſt in great Bears tayl.	2	18972	1 15	57 50	N	34 S	12 65	5 9	2 95
36	Virgins Spike.	1	9687	1 32	9 21	S	33 A	1 12	5 56	3 42
37	ſecon. in great bears tail	2	19754	1 4	56 44	N	33 S	1 17	5 61	3 47
38	Third in great Bears tail	2	20352	1 3	51 3	N	30 S	1 57	6 1	3 87
39	*Centaur*'s right ſhoulder	3	20673	1 48	35 16	S	30 A	1 78	6 22	4 8
40	Arcturus.	1	21010	1 20	21 1	N	30 S	2 1	6 45	4 31
41	South Ballance.	2	21808	1 39	14 34	S	27 S	2 54	6 97	4 83
42	Formoſt Guard.	2	22282	1 17	75 38	N	25 S	2 85	7 32	5 18
43	North Ballance.	2	22474	1 35	8 5	S	24 A	2 98	7 37	5 23
45	Brighteſt North Crown	2	23008	1 7	27 53	N	25 S	3 34	7 78	5 64

Fixed Stars, and their coming to the South the first day of *Right Ascension* and *Declination* for 100 Years.

Marc.	April	May.	June.	July.	Aug.	Sept.	Octo.	Nov.	Dec.	Number.
H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	
A	A	A	A	A	M	M	M	M	M	
7 39	6 5	4 17	2 8	0 1	9 98	8 8	5 27	4 28	2 14	24
9 19	7 31	5 43	3 34	1 27	11 24	9 34	7 53	5 54	3 40	25
9 71	7 83	7 95	3 86	1 79	11 76	9 86	8 5	6 6	3 92	26
					A					
10 36	8 48	6 60	4 51	2 44	0 41	10 51	8 79	6 71	4 57	27
10 44	8 56	6 68	4 59	2 52	0 49	10 59	8 78	6 79	4 65	28
11 20	9 32	6 44	5 35	3 28	1 25	11 35	9 54	7 55	5 41	29
11 23	9 35	7 47	5 38	3 31	1 28	11 38	9 57	7 58	5 44	30
11 41	9 67	7 69	5 60	3 53	1 50	11 60	9 79	7 80	5 66	31
M						A				
0 6	10 18	8 30	6 21	4 14	2 11	0 21	10 40	8 41	6 27	32
0 12	10 24	8 36	6 27	4 20	2 17	0 27	10 46	8 47	6 33	33
0 52	10 64	8 76	6 67	4 60	2 57	0 67	10 86	8 87	6 74	34
1 18	11 30	9 42	7 33	5 26	3 23	0 33	11 52	9 53	7 39	35
1 65	11 77	9 89	7 80	5 73	3 70	1 80	11 99	10 00	7 86	36
							A			
1 70	11 81	9 94	7 85	5 78	3 75	1 85	0 4	10 5	7 91	37
	M									
2 10	0 22	10 34	8 25	6 18	4 15	2 25	0 44	10 45	8 31	38
2 31	0 43	10 55	8 46	6 39	4 36	2 46	0 65	10 66	8 51	39
2 54	0 66	10 78	8 69	6 32	4 56	2 66	0 88	10 89	8 75	40
3 6	1 18	11 30	9 21	7 14	5 11	3 21	1 40	11 41	9 27	41
3 41	1 53	11 65	9 56	7 49	5 46	3 56	1 75	11 76	9 62	42
3 46	1 58	11 70	9 61	7 54	5 51	3 61	1 80	11 81	9 67	43
		M						A		
3 87	1 99	00 11	10 2	7 95	5 92	4 02	2 21	10 21	10 8	44

The *Right Aſcenſion* and *Declination* of 65 of the Principal every Month, with the difference of their

Number.	For the Year 1660. *Names.*	Magnitude.	Right Aſcenſion.	Diff. 100 year.	Declination.	N or S	Diff. 100 year.		Right aſcenſion.	☉ January.	☉ February.
			D. pts.	d. pt	*D. M.*		M		H. pts.	H. pts.	H. pts.
										M	A
45	Brighteſt of Serp. neck.	2	231 95	1 23	07 33	N	21	S	3 46	3 91	5 77
46	Hinder Guard, *Subi.*	2	231 30	0 30	73 16	N	20	S	3 42	3 87	5 73
47	Scorpions heart.	1	242 21	1 55	25 36	S	16	A	4 15	4 58	5 44
48	Serpentarius right knee.	3	252 33	0 83	15 13	S	10	A	4 82	4 29	5 15
49	Hercules head.	2	254 79	1 13	14 50	N	08	S	4 99	4 43	5 29
50	Sagitarius arrow head.	3	266 22	1 62	30 00	S	02	A	5 73	10 18	8 04
51	Dragons head.	3	267 21	0 83	51 36	N	04	A	5 81	10 26	8 12
52	The Harp.	1	276 37	0 85	38 30	N	04	A	6 43	10 87	8 73
53	Swans Bill.	3	289 29	1 03	27 17	N	12	A	7 29	11 73	8 56
54	Sagitarius left thigh.	3	293 50	1 67	35 27	S	14	S	7 57	11 00	9 86
										A	
55	Vultures heart, *Alkair.*	3	293 58	1 28	08 02	N	14	A	7 57	0 01	9 87
56	Swans tail.	2	07 48	0 86	44 06	N	20	A	8 50	0 94	10 80
57	Dolphins head.	3	307 76	1 19	14 57	N	21	A	8 52	0 96	10 82
58	Pegaſus mouth.	3	321 95	1 30	08 21	N	26	A	9 46	1 90	11 76
59	Laſt in tail *Capricorn.*	3	322 12	1 41	17 35	S	27	S	9 48	2 91	11 77
											M
60	Fomahant.	1	339 62	1 42	31 20	S	31	S	10 64	3 08	0 49
61	Pegaſus right ſhoulder	2	341 87	1 20	26 15	N	32	A	10 79	3 26	1 09
62	Pegaſus wing. (*Scheat.*	2	342 00	1 16	13 24	N	32	A	10 80	3 24	1 40
63	Head of *Andromeda.*	2	357 70	1 29	27 14	N	34	A	11 85	4 20	2 15
64	Briteſt *Caſſiopeia's* chain	3	357 83	1 27	57 18	N	33	A	11 86	4 20	2 15
65	Pegaſus wing tip, *Scheat*	2	359 00	1 27	13 18	N	33	A	11 93	4 39	2 25

Fixed Stars, and their coming to the South the first day of *Right Ascension* and *Declination* for 100 Years.

Marc.	April	May.	June.	July.	Aug.	Sept.	Octo.	Nov.	Dec.	Number.
H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	
M	M	M	A	A	A	A	A	A	M	
4 00	2 12	0 24	10 15	8 08	6 05	4 15	2 34	0 35	10 21	45
3 56	2 08	0 29	10 11	8 04	6 01	4 11	2 30	0 31	10 17	46
4 67	2 79	0 91	10 82	8 75	6 72	4 82	3 01	1 02	10 88	47
5 38	3 50	0 62	11 53	9 46	7 44	5 54	3 72	1 73	11 59	48
5 52	3 64	0 76	11 67	9 60	7 58	5 68	3 86	1 87	11 73	49
			M						A	
6 27	4 39	2 51	0 42	10 35	8 32	6 42	4 62	2 62	0 48	50
6 35	4 47	2 59	0 50	10 43	8 40	6 50	4 68	2 70	0 56	51
6 96	5 08	3 20	1 11	11 04	9 01	7 11	5 30	3 31	1 17	52
7 81	5 94	4 06	1 97	11 90	9 87	7 97	6 15	4 17	2 03	53
				M						
8 09	4 33	4 33	2 24	0 17	10 14	8 24	6 43	4 44	2 30	44
8 10	6 21	4 34	2 25	0 18	10 15	8 25	6 44	4 45	2 31	55
9 03	7 15	5 27	3 18	1 11	11 08	9 18	7 37	5 38	3 14	56
9 05	7 17	5 29	3 20	1 13	11 10	9 20	7 39	5 40	3 26	57
					M					
9 99	8 11	6 23	4 14	2 07	0 04	10 14	8 33	6 44	4 20	58
0 00	8 12	6 24	4 15	2 08	0 05	10 15	8 34	6 35	4 21	59
11 17	9 29	7 41	5 32	3 25	1 22	11 32	9 51	7 52	5 38	60
11 32	9 44	7 56	5 47	3 40	1 32	11 40	9 66	7 67	5 53	61
11 33	9 45	7 57	5 48	3 41	1 38	11 48	9 67	7 68	5 54	62
A						M				
10 38	10 50	8 62	6 53	4 46	2 43	00 53	10 72	8 73	6 59	63
00 38	10 50	8 62	6 53	4 46	2 43	00 53	10 72	8 73	6 59	64
00 49	10 50	8 74	6 63	4 56	2 53	00 63	10 82	10 83	6 67	65

A Table of the Complement of the Suns right Ascension, for every day at midnight, in hours and hundred parts.

Days.	January		February		March		April.		May.		June.	
	H.	pts.	H.	pts.	H.	pts.	H.	pts.	H.	pts.	H.	pts.
1	4	40	2	27	0	50	10	62	8	73	6	64
2	4	33	2	21	0	44	10	56	8	67	6	57
3	4	26	2	14	0	37	10	49	8	60	6	50
4	4	18	2	8	0	31	10	43	8	54	6	43
5	4	11	2	1	0	25	10	37	8	47	6	36
6	4	5	1	95	0	19	10	31	8	40	6	29
7	3	98	1	88	0	13	10	25	8	34	6	23
8	3	90	1	82	0	7	10	19	8	27	6	16
9	3	83	1	79	0	1	10	12	8	21	6	9
10	3	76	1	69	11	95	10	6	8	14	6	2
11	3	69	1	63	11	89	10	0	8	7	5	95
12	3	63	1	56	11	83	9	94	8	1	5	88
13	3	55	1	50	11	77	9	88	7	94	5	81
14	3	48	1	44	11	71	9	81	7	87	5	74
15	3	41	1	38	11	65	9	75	7	80	5	66
16	3	33	1	31	11	59	9	69	7	64	5	60
17	3	27	1	25	11	53	9	63	7	67	5	53
18	3	20	1	19	11	47	9	56	7	60	5	46
19	3	13	1	13	11	41	9	50	7	53	5	39
20	3	7	1	6	11	35	9	44	7	57	5	33
21	3	0	1	0	11	28	9	38	7	40	5	26
22	2	93	0	94	11	22	9	31	7	33	5	19
23	2	46	0	88	11	16	9	25	7	26	5	12
24	2	79	0	82	11	10	9	18	7	20	5	5
25	2	73	0	75	11	4	9	12	7	13	4	98
26	2	66	0	69	10	98	9	6	7	7	4	91
27	2	59	0	63	10	92	8	99	6	99	4	85
28	2	53	0	57	10	86	8	93	6	92	4	78
29	2	47			10	80	8	86	6	85	4	71
30	2	39			10	74	8	80	6	78	4	64
31	2	33			10	68				71		

A Table of the Complement of the Suns right Aſcenſion, for every day at midnight, in hours and hundred parts.

Days.	July.		Auguſt.		Septemb.		October.		Novem.		Decem.	
	H.	pts.	H.	pts.	H.	pts.	H.	pts.	H.	pts.	H.	pts.
1	4	57	2	54	0	65	10	84	8	84	6	70
2	4	51	2	48	0	59	10	78	8	77	6	72
3	4	44	2	42	0	53	10	72	8	70	6	55
4	4	37	2	36	0	47	10	65	8	63	6	48
5	4	30	2	29	0	41	10	59	8	56	6	40
6	4	24	2	23	0	35	10	53	8	49	6	33
7	4	17	2	17	0	29	10	47	8	42	6	25
8	4	10	2	11	0	23	10	40	8	35	6	18
9	4	3	2	4	0	17	10	34	8	28	6	11
10	3	97	1	98	0	11	10	28	8	23	6	3
11	3	90	1	92	0	5	10	22	8	15	5	96
12	3	84	1	86	11	99	10	15	8	8	5	88
13	3	77	1	80	11	93	10	9	8	1	5	81
14	3	70	1	74	11	89	10	2	7	93	5	73
15	3	63	1	68	11	81	9	96	7	86	5	66
16	3	57	1	61	11	75	9	90	7	71	5	59
17	3	51	1	55	11	69	9	83	7	73	5	51
18	3	44	1	49	11	63	9	77	7	65	5	44
19	3	38	1	43	11	57	9	70	7	58	5	36
20	3	31	1	37	11	51	9	67	7	50	5	29
21	3	25	1	31	11	45	9	60	7	43	5	21
22	3	18	1	25	11	39	9	51	7	36	5	14
23	3	13	1	19	11	33	9	44	7	28	5	7
24	3	5	1	13	11	27	9	37	7	21	4	99
25	2	99	1	7	11	20	9	31	7	14	4	92
26	2	92	1	1	11	14	9	24	7	7	4	85
27	2	86	0	95	11	8	9	18	6	99	4	78
28	2	80	0	89	11	2	9	11	6	92	4	70
29	2	73	0	83	10	96	9	4	6	84	4	63
30	2	67	0	77	10	90	8	98	6	77	4	55
31	2	61	0	71			8	91			4	48

A Deſcription of the former Table of the Suns Right Aſcenſion.

I Think it not amiſs, before I ſhew you the uſe of the former Table of Right Aſcenſion, for the finding of the time of any Star coming to the Meridian, to explain unto you what we call Right Aſcenſion.

Know therefore, that in the Sphere there is *Right Aſcenſion*, *Oblique Aſcenſion*, and *Mean Aſcenſion*, which have all ſeveral Definitions: but the reſt being impertinent, I will only ſpeak of *Right Aſcenſion*, which is thus defined: *Right Aſcenſion* is that portion of the equinoctial which cometh to the Meridian of Noon-ſtead with any Star, or any part of the Ecliptick; or more plainly, it is that number of Degrees of the Equinoctial, compriſed between the Vernal Equinoctial point, or interſection of the ſaid Equinoctial Circle and the firſt minute of *Aries*, and that Star or part of the Ecliptick, which is upon the Meridian at the day or time deſired. As for your better underſtanding, if the beginning of *Aries* being upon the Meridian, or any point or Star in the ſaid beginning of *Aries*, then hath the ſaid point or Star ſo ſcituated, no Right Aſcenſion at all, by reaſon that the beginning of the Equinoctial cometh to the Meridian therewith: But if the beginning of *Cancer*, or any Star in that ſcituation be upon the Meridian, then is there with it, under the ſame Meridian 90 Deg. of the Equinoctial, or 6 hours of time, being that every 15 Deg. of the Equinoctial, anſwers to one hour of time, ſhewing that the Star or point which is in the beginning of *Aries* ſhall come to the Meridian 6 hours ſooner than that other, which is in the beginning of *Cancer*, and ſo others. I doubt not but that theſe few words will ſuffice to give you the better light to that which follows. Firſt therefore, to find the Right Aſcenſion of the Sun at any time, look for the Month in the head of the Table, and for the day of the month at the left ſide of that face, where the Month deſired is, and in the common Angle anſwering to them both, is the Hour and Minute of the Suns Right Aſcenſion.

The uſe of the former Tables of the fixed Stars, and of the Suns Right Aſcenſion.

This Table of the fixed Stars is reduced from 77 Stars to 65, which yet will be no leſs unto the Sea-men. For thoſe Stars, which are left out are either very ſmall, (and ſo not fit for Obſervation) or elſe they

are

are ſuch as are ſo far to the Southwards that they could not be obſerved by *Tycho*, or any of the *European Mathematicians*, whoſe obſervations are *Anthentical*, and by this means there is very great difference in their Accounts: As for Example, the two chiefeſt Stars left out are the laſt of *Eridanus* and *Canopus*, belonging to the Conſtellation of *Argo*, which are indeed Stars of the firſt Magnitude, and therefore if it were poſſible to have their true places, they would be of good uſe: But ſeeing ſome account the laſt of *Eridanus* to be in 21 deg. 10 min. ♈, and Latitude S. 23 deg. 30 min. and others account it in 9 deg. 45 min. ♓, and Latitude S. 59 deg. 30 min. while the truth is better known, we need not relie upon ſuch an uncertainty, having ſo many other Stars fit for obſervations. So likewiſe for *Canopus*, ſome reekon it to be in 8 deg. ♋, and South Latitude 75 deg, others allow it 69 deg. of Latitude.

In ſtead of theſe two, I have added to the Table a Star of the ſecond Magnitude, in the top of the Wing of *Pegaſus*, a Star ſo fit for obſervation, that Mr. *Gunter* maketh choice of it for one of the 5 Stars to be ſet upon his Quadrant. And all theſe Stars have their allowance of Right Aſcenſion and Declination for 100 years, by which you may rectify them in time to come. I have ſet down their places for the year 1660, and this Table will need no rectifying till the year 1670.

To find the time of any Stars coming to the Meridian, the firſt day of every Month, ſeek the number of the Star in the firſt Column of the left hand page, and ſeek the ſame number in the laſt Column of the right hand page, and in the ſame line under the names of the Month that you ſhall ſee the hour and hundreth part the Star comes to the Meridian.

Example.

I do deſire to know at what time the *Bulls Eye* comes to the Meridian the firſt day of *January*, I look in the firſt Column of the left hand page, and I find his number 13, then I look 13 in the laſt Column of the right hand page, and right under *January* in the ſame line I find 8 Hours, and 71 Hundred parts; and becauſe I find the letter *A* next over head, I ſee it is Afternoon, that is, 8 of the Clock at night, and 71 Hundred parts, which is near three quarters of an hour, and ſo of all other.

Again, here you may ſee by the Tables what number of theſe Stars are in Rule for Obſervation at any time.

Example.

I desire to know how many of these Stars are in the Rule for Observation the first of *January*, I look in the Table, and I find the second Star, that is, the Southermost in the *Whales Tail*, to come to the Meridian at 4 a Clock and 88 parts afternoon, that is, near 5 of the Clock in the evening, about which time the Stars begin first to appear: and so I follow on under the Month of *January*, until I come to 6 a Clock 1 part in the morning, that is, the 38 Star, which is the third in the *Great Bears Tail*, between which and the fourth Star are 36 Stars that are in the Rule for Observation the first of *January*.

But that you may know the time of any Star coming to the Meridian, and day of the Month; and that somewhat more exactly, and with more ease, than by the Rule formerly subscribed in this Book: I have in the Tables of the Stars, added the *Right Ascension* of every Star, in hours and hundred parts; and also made alteration in the Table of the Suns *Right Ascension*, setting down the complement of the Suns *Right Ascension*, instead of the Right Ascension, which is more easie in the use of it. For this requires only Addition, the other Substraction; and many times one may forget, and substract the one instead of the other. This Table also is fitted to the time of Midnight, which is most proper, because the Stars are only visible in the night. And in the Right Ascension both of the Sun and Stars, I have not exceeded 12 Hours, the account by that means being more easie; and if you know not whether the time fall out in the evening or morning, the Tables of the Months will direct you.

Now the Rule for the using is thus: Add the Right Ascension of the Star, and the Complement of the Suns Right Ascension for any night (as you find it in the Table) together, and the sum is the time of the Stars coming to the South; but if the sum exceeds 12, cast away 12, and take the Remainer.

For Example.

The Right Ascension of the *Bulls Eye*, is —— 4 *h.* 48 *pts.* The Complement of the Suns Right Ascension, *January* 21, is 3 *h.* 0 *pts.* These two added together, make——7 *h.* 48 *pts* which is the time of that Stars coming to the South the 21 day of *January*, at night, and so you must do for any other Star, at any other day.

To rectifie the Right Aſcenſion *of any of theſe Stars, whoſe difference is given, to any time within* 100 *years.*

I Deſire to know the Right Aſcenſion of *Orions* right ſhoulder in the year 1686. ſubſtract 1660 out of 1686, the difference is 26: then ſay, if 100 years give 1 deg. 37 parts for the difference of Right Aſcenſion, what ſhall 26 years give? and you ſhall find 0 deg. 35 parts *fere*, which added to 84 deg. 27 parts, the Right Aſcenſion of the ſaid Star in the year 1660, the ſum is 84 deg. 62 parts, the Right Aſcenſion of the ſame Star in the year 1686, and the like of all other.

To rectifie the Declination of any of theſe Stars that have the difference given to any time within 100 *years.*

Example.

I deſire to know the Declination of the Pole-ſtar for the year 1667, I ſubſtract 1660 out of 1667, the difference is 7, then ſay, if 100 years give 34 min. for the difference of Declination (as you may ſee in the Table) what ſhall 7 years give? and you ſhall find 2 min. 38 parts, which is to be added, as you may ſee by the letter *A* in the laſt Column, to 87 deg. 30 min. the Declination of the Pole-ſtar for the year 1660, and the whole is 87 deg. 32 min. the Declination of the Pole-ſtar for the year 1667. This way of rectifying the Right Aſcenſion and Declination, I doubt not but it ſhall meet with ſome captious cenſures, but I know the defect between this and Calculation cannot be ſo palpably as theirs in cenſuring: howbeit in the mean time we may ſee, that the former Tables for theſe Stars that I have Calculated muſt be renewed again at moſt in 20 years, or elſe errors will be in their uſe.

HAving ſufficiently explained unto you the manner and way, how both by the Sun and Stars to attain to the true height of the Pole, or Latitude of any place, I purpoſe now (God willing) to ſpeak ſomewhat of the Longitude, which as the former is moſt eaſie, and the finding thereof known almoſt to all Sea-men, ſo is the other as uncertain, and hath not yet hitherto been found or known exactly to any, albeit that many learned men, and of great experience, having laboured very earneſtly for the ſame, and many good means have they invented, as helps and aſſiſtance unto Mariners in their long Navigation and Travels,

vels, by which, though with great labour, care and induſtry, they tranſport themſelves to the utmoſt Regions of the World: with far more eaſe and facility they might do it, if they could as perfect and readily find the *Longitude* at all times, as they may the *Latitude*; for then having ſailed many days in unknown parts upon the large and ſpacious Seas, and induring all thoſe indurable troubles, miſeries, and unſpeakable calamities, which do for the moſt part attend upon long Voyages; yet after all this, if upon the firſt fair opportunity they could readily with the *Latitude* find alſo the *Longit.* their fore-paſſed troubles would be joyfully remedied, being that theſe two (like loving Siſters) would apply ſuch pleaſing comfort to their cold ſtomachs, after their tedious Travels, by giving them the true prick or place of their then preſent being; *Peter Apian*, and *Gemma Friſius* have written thereof, as alſo ſome others; but truly in my opinion, it was never brought to ſo requiſite perfection, as is now adays: and for me to write thereof were but as it were to ſet up a Candle at noon day, rather to ſhew mine own folly, than to light thoſe that know a better way than my ſelf; in which doing, well may *Apelles*'s ſaying, *Ne Sutor ultra crepidam*, be applied unto me: But for my excuſe, I do intreat the judicious to perſwade themſelves, that it is far from my thoughts to ſet down any thing in this for a preſident unto them, but only in good will to ſhew my opinion thereof to the ignorant, being as followeth.

Firſt therefore, the Latit. being known, by finding the Long. alſo, you have the true prick or place in the Globe or Card, where your Ship is, which to find the neareſt, is two ways; one by dead Reconing, the other by Obſervation: But dead Reckoning (as they call it) being as I take it moſt uſed, I will ſpeak firſt thereof, by which if it were poſſible that this Reckoning could exactly and preciſely be kept, it would give both Latitude and Longitude without any Obſervation at all: the different Latitude being only the diſtance that the Ship is departed from the Parallel where ſhe laſt was, either Northward or Southward: and Longitude being the diſtance that ſhe is departed from the Meridian either Eaſtward or Weſtward: for the knowledg thereof, theſe things are principally to be conſidered.

Firſt, the true prick or place of the Ships being at the beginning of the Voyage.

Secondly, a ſound and experimented judgment of the way that the Ship maketh with every ſhift of wind.

Thirdly,

Thirdly, to know exactly how much the Compaſs doth vary from the true North or South point; upon which the Needle is toucht either Eaſtward or Weſtward, in as many ſeveral places as conveniently may be obſerved.

Fourthly, to note diligently the Floods or Currants, which may cauſe the ſhips way to be more Leeward, or otherwiſe, than expectation, and to give allowance of her Courſe and way accordingly.

Fifthly, the ſeveral points of the Compaſs that ſhe makes her Courſe good upon, and what way ſhe hath made upon every point.

Sixthly, to bring thoſe ſeveral Courſes into one ſtreight line, thereby to know what Courſe ſhe hath made good, with the neareſt diſtance upon the ſaid point or Rumb, that ſhe hath made her way good upon.

And laſtly, knowing how many Leagues doth raiſe or lay a Deg. upon the ſaid Rumb, and true reckoning of your ſaid Courſe and Diſtance, gives you the difference of Latit. or the Parallel where the Ship then is: And alſo knowing how many Leagues anſwer to a Deg. of *E.* and *W.* in the ſaid Parallel, the Courſe, Diſtance, and Latit. gives the difference of Long. or the Meridian under which the Ship then is, the interſection of which ſaid Parallel and Meridian is the prick or place of the Ships then being; of which things I will ſpeak more particularly afterward.

Now it reſteth to ſpeak ſomething of knowing the Long. only by obſervation, which is very neceſſary to be known, that thereby the one may make tryal of the other, being that if the accompt by dead Reckoning, and alſo by Obſervation do both agree in the Latit. and Long. then you may well be aſſured, that you know truly the place where you then are, which Long. by Obſervation is thus known: prepare a very perfect and true running Glaſs, which may preciſely run 24 hours without errour, and about the time that you purpoſe to ſet ſail, ſet the ſaid Glaſs a running juſt at 12 a Clock, when the Sun is upon the Meridian: being rnn out, be ſure to turn the ſaid Glaſs inſtantly as it is out, not loſing any time in the turning of it; and ſo having very warily kept the ſaid Glaſs till you think good to make an Obſervation, at which time it is requiſite to have in readineſs an half hour Glaſs, and a minute Glaſs, that if the 24 hour Glaſs be out, before the Sun comes to the Meridian, then ſo ſoon as it is out, to turn the half hour Glaſs or minute Glaſs, as you ſee occaſion, thereby to know preſently how much the 24 hour Glaſs is out before the

the Sun comes to the Meridian: for if the Sun is upon the Meridian juſt when the 24 hour Glaſs is out, then you may aſſure your ſelf that you have ſailed North and South, and are ſtill under the ſame Meridian you were at firſt, but if the 24 hour Glaſs be out before the Sun comes to the Meridian; for every 4 minutes that the Glaſs is out before noon, your difference of Longitude is 1 Deg. to the Weſtward, and for every hour 15 Degrees.

And contrary, if the Sun comes to the Meridian before the Glaſs is out, then according to the ſame proportion of time is your difference of Longitude to the Eaſtward, which difference of Longitude, if you multiply by the number of Miles anſwerable to a Degree of Longitude in that Latitude, where you then find your ſelf to be, the Product gives the miles of the diſtance, that you are either to the Eaſtward, or Weſtward of the Meridian that you are departed from.

The like may alſo be effected by any of thoſe fixed Stars, whoſe true time of coming to the Meridian you know: for if the account of time preciſely kept by your glaſs, and the Stars coming to the Meridian, as you find in your Table of *Right Aſcenſion* do juſtly agree, then are you ſtill under one and the ſame Meridian; but if the time be paſt by your account, that the ſaid Star ſhould be upon the Meridian, before the Star doth come to the Meridian; for every hour that the Star comes to the Meridian after the ſaid time paſt, your difference of Longitude is 15 Degrees to the Weſtward, and for every hour that the Star comes to the Meridian before, by your account of time truly kept, it ſhou'd be upon the Meridian, your difference of Longitude is 15 Degrees to the Eaſtward.

Although the Author of this Book in his time, knew of no other means to attain the Longitude, than by ſuch as he hath here publiſhed, and by the Eclipſes which ſeldom happen, yet ſeeing it hath pleaſed God ſince his time to reveal a manifeſt way, (which cannot be ſtopped, but it will come to perfection) to attain the Longitude; I ſuppoſe it is neceſſary to ſpeak ſomething of it, becauſe it falls out ſo fit in this place.

Remark by Mr H. Bond

THere are ways that are not imaginary (as ſome affirm) but real, and grounded upon certain natural principles, as any Mathematical Concluſions whatſoever, in *Geography* or *Navigation.*

And whatſoever many may expect ſome excellent way for it from Foreign parts, by certain ſmall Stars near *Jupiter*, and that ſome here at home would have the World conceited of a way by Celeſtial Obſervation; yet it is without doubt, the Longitude muſt be found by Obſervation made of ſomething below the Moon: for I do truly affirm, that there are Magnetical Poles, whoſe Latitude and Longitude I do as certainly know, as concurrent Obſervations and Arithmetical Calculations can diſcover them; and their Annual motion I know, and by conſequence the time of their Revolution. It may be objected; that the Variation in many, nay in moſt places, are very irregular, and not according to ſuch Magnetical Poles as I ſpeak of; for in ſome places on the ſame Parallel in equal ſpaces, it altereth much ſwifter than in other; beſides in the Parallel of *London*, there is 2 Degrees 00 Eaſterly variation to the Eaſtwards of *London*, and 2 Degrees 00 Eaſterly variation to the Weſtwards of *London*; and yet both theſe places are to the Eaſtward of the firſt Meridian of the World, within 45 Degr. 0 Min. of Longitude. It is true; but all this I can very well reſolve, and I doubt not but to do it for all places: Moreover, there are ſome places within a certain Longitude, whoſe variations continue conſtant for hundreds of years, and yet afterwards do vary as ours here at *London* doth now; but at *London* it is never conſtant, although in in former time the variation of it was not ſenſible, it is now in its ſwifteſt motion. It were to be wiſhed (that as many Noble minded Men have been at the charge often times to adventure towards the ſeeking out a paſſage *Northweſt* into the *South Sea*) that ſome Noble minded would take this into conſideration, or that ſome Noble-Men furniſhed with convenient and exact Inſtruments, might make Obſervation to the *Weſtwards*, for the more full perfection of this work, it would make much for their laſting Fame, and for the Honour of this Kingdom. But becauſe I am confined to a little room, I muſt abruptly end my Diſcourſe of *Longitude*; only take notice,

that thoſe that live until the Year of our Lord 1657, ſhall not ſee any variation at all at *London*, and afterwards it will increaſe *Weſtwardly* at leaſt for 50 Years.

This being written by Mr. *Bond* 20 Years ago, it came to paſs exactly; ſo that in *July* 1657, it was obſerved there was no Variation at *London*; and now the Variation will begin to be *Weſterly*, and will increaſe *Weſterly* about 11 *minutes* every year for the firſt 30 or 40 years, but afterwards the motion will not be ſo faſt. The Period of the motion is about 370 years.

Of the Variation of the Compaſs.

COncerning the Variation of the *Compaſs*, it hath been very learnedly treated on by divers of our Countrey-men, and in our Vulgar Tongue, and namely by Mr. *Norman*, and Mr. *Burrows*, in their Books called the *New Attractive*, and *Variation* of the *Compaſs*: and ſince that moſt excellently and ingeniouſly written of, by that rare and Learned *Mathematician* of our time Mr. *Wright*, in his Book of the *Correction of Errours in Navigation*, as alſo in his *Tranſlation* called the *Haven-finding Art*: In which reſpect it is needleſs for me here to write any thing thereof, only let it ſuffice to ſpeak a little thereof, and being neceſſary to the knowledge of the foregoing matter; for them that would willingly note how much the *Compaſs* doth vary in ſeveral places of their Sailing, I think it beſt to have the Needles of their *Compaſs* touched upon a good Stone, and ſo placed directly under the *North* Point of the *Fly* without allowing any Variation at all, the outward edge of the ſaid *Fly* to be graduated to each quarter into 90 Degrees, for the ready reckoning of the degrees that the *Compaſs* doth vary from the true *North* or *South*, either towards the *Eaſt* or *Weſt*. Over which *Fly*, it is neceſſary to have a round Circle of Braſs with two Sights upon the ſame, the one directly againſt the other at oppoſite Points, to be raiſed perpendicularly where occaſion ſhall ſerve; which Circle with the Sights thereon, as I have ſaid, being placed upon the Glaſs over the *Fly* within the Box, where the *Compaſs* is, when you would obſerve the *Variation* of the *Compaſs*, juſt either at the Sun Riſing or Setting, turn the Sights in the Braſs Circle to-

wards the Sun, and looking through the ſame, mark preciſely how many degrees the Sun Riſeth or Setteth from the *Eaſt* or *Weſt* Point of the *Fly* or *Compaſs*: for if the Sun be in the Equinoctial, having then no Amplitude, ſo much as is the difference of the Suns Riſing or Setting from the *Eaſt or Weſt* Points ſhewed by the Compaſs is the Variation of the compaſs from the true *North* or *South*; but if the Sun be either to the Northward or Southward of the Equinoctial, having amplitude, then is there a reſpect alſo to be had to the Suns Amplitude: as thus, if the Sun hath *North* or South amplitude, and that you obſeve the Sun to Riſe or Set ſo much from the *Eaſt* or *Weſt* Point of the Compaſs, as is the Suns Amplitude, and likewiſe the ſame way that the Amplitude is, then hath the Compaſs no Variation: but if the Sun having *North* Amplitude, riſeth notwithſtanding more Northerly by your Compaſs, then by the ſaid Amplitude it ſhould do, the degrees of true Amplitude deducted from the Amplitude which the Compaſs ſheweth, leaves the Variation of the Compaſs to the Eaſtwards of the North; But if the true Amplitude be greater than the Compaſs ſheweth, the one deducted from the other, leaveth the Variation to the weſtward of the North: and if the Amplitude be Southerly, and the Compaſs ſhew the Sun to riſe Northerly, both the differences added together, giues the Variation Eaſterly: or if the Amplitude be Norrherly, and the Compaſs ſhews it to be Southerly, then both the differences added together, gives the Variation to be Weſterly. All this is to be underſtood, when you obſerve by the Amplitude *Ortive (viz.)* at the Suns riſing: for if you obſerve the ſetting thereof, then by adding or deducting the differences between the true Amplitude known, and the amplitude given by the Compaſs, the Total or remainer ſhews the Compaſs to vary ſo much to the contrary ſide; an Example will make all this plain unto you, which let it be thus propoſed; Suppoſe that being a Sea you find by the Table of *Sines hereafter ſet down (or by ſome other means) the Suns Amplitude at the time to be 10 d. gr. to the Northward; and ſeeing the Sun at his riſing, by the Compaſs (as is before ſhewed) you find that the Sun riſeth 35 degrees to the Northward of the Eaſt, which is ſomewhat to the Northward of the North-eaſt and by Eaſt Point, therefore ſubſtracting 20 degr.

**See* Prop. 3. *of the uſe of Sines.*

the Suns true Amplitude from 35 Degrees, the Amplitude which the Compaſs ſheweth, the Remainer being 15 Degrees, ſheweth the compaſs to be ſo much varied from the North to the Eaſtward, which is one whole Point and above $\frac{1}{3}$: otherwiſe the Sun having the ſame Amplitude Northerly (as is aforeſaid) and ſetting him at his going down by the Compaſs, the ſaid Compaſs ſheweth him to Set only 5 Degrees to the Northward of the Weſt, which deducted from 20 Degrees, the true Amplitude leaveth 15 Degrees for the Variation of the Compaſs to the Eaſtward, as before.

As for Example.

Suppoſe that the Sun having 23 Degrees of South Amplitude, and the Compaſs ſheweth the Amplitude or Riſing to be 11 Degrees Northerly, add 23 Degrees the true Amplitude, with 11 Degrees of contrary Amplitude, which the Compaſs ſheweth, and the Product 34 Degrees, being three whole Points, and ſomewhat more, ſheweth that the Compaſs is ſo much Varied from the true North to the Eaſtward.

Again, the Sun having the ſame Amplitude Southerly, you obſerve at his Setting, and find by your Compaſs that he Setteth 11 Degrees Northerly, adding the two Amplitudes as aforeſaid 23 and 11, the Product 34 ſheweth the Variation ſo much to the Weſtward, being that in the Obſervation at his Riſing, the Eaſt and by North Points of the Compaſs ſtandeth where the Eaſt South-Eaſt ſhould be, and at his Setting in the other Obſervation, the Weſt and by North Points of the Compaſs pointed to the Sun, in which place ſhould be the Weſt South-weſt Points.

Theſe few words will ſuffice, being (that albeit to the ignorant they ſeem ſomewhat dark,) yet in the practice thereof, they ſhall find it I doubt not, very plain and eaſie for their underſtanding: otherwiſe there are ſundry ſorts of Inſtruments to find the Variation by; but others having already written thereof, I have thought good alſo to ſhew my Opinion of this plain and eaſie way, knowing that the Marriners having made Experience of many ways, will only uſe that which they find beſt, both for their eaſe, profit, and truth thereof. And note, that whatſoever is here ſpoken concerning the finding the Variation by the Amplitude, the very like may be obſerved by

the *Azimuth*, which by the Sun or Stars being to be ſeen, may at any time be known.

How many Leagues ſayling upon any point of the Compaſs will raiſe or lay a Degree of Latitude, and what departure from the Meridian you make thereof.

THis is ſo common in every Book, that I need not to write thereof, but only being that it is a neceſſary help to that which hath been before ſpoken of, it is not amiſs to ſet it here down, as followeth.

Firſt, Sayling South and North, you keep ſtill one Meridian: and in ſailing 20 * *Engliſh* leagues, you either raiſe or depreſs the Pole 1 Degree. But if you Sail upon the firſt Point or Rumb from North or South, either Eaſtward or Weſtward, you muſt ſail 20 Leagues, and one third part, to raiſe or lay 1 Degr. of Latitude: and ſo having changed your Parallel a Degr. you are alſo departed from your firſt Meridian 4 Leagues, the way which your Courſe was.

Upon the ſecond Point or Rumb from North to South, 21 Leagues and one third, to lay a Degree of Latitude, and your diſtance from the Meridian is 8 Leagues, and one third.

Sailing upon the third Point 24 Leagues, to raiſe or lay a Degree and diſtrnce from the firſt Meridian, is 13 Leagues and one third.

* Here note, that although the Author hath ſet down *Engliſh* Leagues; yet it muſt be 20 ſuch Leagues as anſwers to a Degr. of the Meridian; and therefore the Knots on the Log-Line muſt be 5 foot aſunder at leaſt, according to the late Experience made by Mr. *Richard Norwood*, which Experiment was formerly verified by Practice at Sea by Capt. *Thomas James*, in his Voyage to the North-weſt, as we may ſee in the 7th Page of his Journal, by the Courſe, Diſtance, and Latitudes from the *Blakey* (on the Weſt of *Ireland* (to *Cape-Farewel*, compared with Mr. *Norwood*'s Experiment.

But becauſe many will hardly be drawn to alter their Knots from their old form; Therefore if any man will multiply 112, by the Knots run out in half a minute, the Product, cutting off two Figures to the right hand, ſhall be the number of Leagues run in a Watch, according to Mr. *Norwood*'s Experience.

Upon

Upon the fourth Point 28 Leagues, and one Third, raiſe or lay a Degree of Latitude, and diſtance from the Meridian, is 20 Leagues.

Upon the fifth Point 36 Leagues raiſe or lay a Degree of Latitude, and diſtance from the Meridian, is 30 Leagues.

Sailing upon the ſixth Point or Rumb 52 Leagues and one third, raiſe or lay a Degree, and having altered your Latitude one Degree upon that point, you are departed from the firſt Meridian 48 Leagues, and one third.

If you Sail upon the Seventh point, being the next from the Eaſt or weſt you may Sail 102 Leagues, and two Thirds, before you raiſe or lay the Pole one Degree, and then are you 101 Leagues from your firſt Meridian: But if you Sail Eaſt or weſt, then are yon ſtill in a Parallel, and neither raiſe nor lay the Pole at all.

To find the diſtance of any two places, knowing the Longitude and Latitude of them.

IF the two places differ only in Latitude, then are they both under one and the ſame Meridian: and to know the diſtance betwixt them in Miles or Leagues, multiply the number of the Degrees of difference by 60 Miles, or 20 Leagues, the Product of which multiplication gives the true diſtance between them in Miles or Leagues according as you work them, being that 60 Miles, or 20 Leagues make 1 degree of a great Circle: But if the one place have *North* Latitude, and the other *South*, then add both their Latitudes together, and work as aforeſaid: and if both the places are under the Equinoctial, they have then no Latitude. And there likewiſe 60 miles or 20 Leagues make 1 degree, and the working like the former, if the difference be under 180 degrees. For if the difference be more than 180, Subſtract the ſaid difference from 360, and multiply the remainer by 60 or 20, as before.

Theſe are ſo plain and eaſie that they need no Example: But if they differ both in Longitude and Latitude, or in Longitude only in that Parallel beſide the Equinoctial, the working is ſomewhat more difficult, by reaſon that the further the Parallels are diſtant from the Equinoctial towards either of the Poles, the ſhorter they

are; and the ſhorter the Parallels are, the fewer Miles make a Degree; ſo that whereas in the *Equinoctial* 60 miles makes 1 degree; yet in Longitude, where the Pole is raiſed about 52 degrees, in this Parallel 37 miles make a degree, and ſo every 37 miles Eaſt or Weſt in this Parallel, are ſo many degr. For which purpoſe I have here added a new Table ſhewing the miles of diſtance anſwerable to a degree in every ſeveral Latitude from the *Equinoctial* towards either of the *Poles*: and when you know the miles anſwerable to a degree in the Parallel deſired, if the difference of the two places be only in Longitude, multiply the difference of their Longitude by the number of miles anſwerable to a degree, and the product ſheweth the diſtance in *Engliſh* or *Italian* Miles betwixt the ſaid two places.

Example.

London and *Middlebrough* have both in a manner one Latitude, (*viz.*) about 52 degr. and I find in this Table, that in the Parallel of 52 degrees, 36 miles 84 parts makes a degr. of Longitude, the Longitude of *London* is 25 degr. 50 min. which ſubſtracted one from another, leaves 3 degr. 50 min. for the difference of Longitude. Then multiplying 3 deg. by 37 miles, the product is 111 miles: Then for 50 min. I ſay by the Rule of Three, if 60 min. give 37 miles, what give, 50 min? *facit* near 31, which added to 111, makes 142 miles, or 47 Leagues and a mile, for the diſtance between *London* and *Middlebrough*.

But if the two places differ both in Longitude and Latitude, then is the Working more difficult than either of the former,

Latitude.	Miles and 100 parts in a degr.		Latitude.	Miles and 100 parts in a Deg.	
	M.	Pts.		M.	Pts.
1	59	99	46	41	68
2	59	96	47	40	92
3	59	92	48	40	15
4	59	85	49	29	36
5	59	77	50	28	57
6	59	67	51	27	76
7	59	55	52	36	94
8	59	42	53	36	11
9	59	26	54	35	27
10	59	09	55	34	41
11	58	91	56	33	55
12	58	69	57	32	68
13	58	46	58	30	80
14	58	22	59	30	90
15	57	96	60	29	00
16	57	67	61	28	09
17	57	38	62	27	17
18	57	06	63	26	24
19	56	73	64	25	30
20	56	38	65	24	36
21	56	01	66	23	40
22	55	62	67	22	44
23	55	23	68	21	07
24	54	81	69	20	50
25	53	38	70	19	52
26	53	93	71	18	53
27	53	46	72	17	54
28	52	98	73	16	54
29	52	48	74	15	54
30	51	96	75	14	53
31	51	43	76	13	51
32	50	88	77	12	50
33	50	32	78	11	47
34	59	74	79	10	45
35	59	15	80	09	42
36	58	54	81	08	38
37	57	92	82	07	35
38	57	28	83	06	31
39	56	63	84	05	27
40	45	96	85	04	23
41	45	28	86	03	18
42	44	59	87	02	14
43	43	88	88	01	09
44	43	16	89	00	05
45	42	43	90		00

For firſt, you muſt take the difference of the two places in Longitude, and then their difference alſo in Latitude: then Multiply the difference of Latitude of the two places by 60, and ſet the Product thereof by it ſelf for the firſt number: then multiply the difference of Longitude by the number of Miles anſwerable to each Latitude ſeverally, and add both the Products together: the half whereof ſet down for your ſecond number, and Multiplying each of the ſaid two numbers into it ſelf ſquarely, add both the Products together, and extracting the Square Root thereof, the ſaid Square Root is the diſtance between the two places deſired.

But for the finding the Diſtance of places, here follows an eaſier way, and more natural by the Table of Sines, which will be neceſſary to make uſe of the Table of Longitude and Latitude, as alſo to make uſe of the Difference that is between the true diſtance of places as they are upon the Globe, and as moſt of them are laid down upon the plain Sea Chart.

1. IF one place be under the Equinoctial, and the other have Latitude, and their difference of Longitude be 90 degrees 0 min. then their diſtance aſunder is 90 degr. 0 minutes.

2. If one place under the Equinoctial, and the other have Latitude, and their difference of Longitude be more than 90 Degrees 0 Min. Subſtract 90 Degrees from it, and ſeek the Sine of the Remainer, and add it to 10000, and multiply the Sum by the Sine of the Compliment of the Latitude of the other place, cutting off 4 Figures to the Right hand from the Product, and from the reſt Subſtract the Sine of the Compliment of the Latitude given, and the Remainer ſhall be the Sine of the Compliment of the Diſtance between the two places, unto the Arch of which Sine add 90 degr. 0 min. and the whole is the diſtance required.

But if the difference of Longitude be leſs than 90 degr. 0 min. Subſtract it out of 90 degrees 0 min. and ſeek the Sine of the Remainer, and multiply it by the Sine of the Compliment of the Latitude given, cut off 4 Figures to the right hand from the Product, and the reſt is the Sine of the Compliment of the diſtance between the two places.

3. If both places have Latitude, add one Latitude to the Compliment of the other, and ſeek the Sine of the Sum, which Sine keep:

Then if the difference of Longitude be more than 90 Deg. 0 Min ſeek the Sine of the exceſs above 90 deg. 0 min. and add it to 10000. which Sum keep; but if it be leſs than 90 Deg. 0 Min. ſeek the Sine of the Complement of it, and Subſtract it from 10000. and keep the Remainer: Next Multiply the Sum kept, or this Remainer by the Sine of the Complement of one Latit. cutting off 4 Figures to the right hand of the Product, and the reſt Multiply by the Sine of the Complement of the other Latitude, cutting off 4 Figures to the right hand of the Product, and take the difference between the laſt Product, and the Sine of the Sum of the Complement of this one Lat. added to the other Latit. which difference ſhall be the Sine of the Complement of the diſtance between two places.

Note, if the laſt Product be equal to the Sine of the Sum of the Complement of one Latitude added to the other Latitude, the two places are 90 Deg. 0 Min. diſtant aſunder; but if it be leſs than the ſaid Sine, they are leſs than 90 Deg. 0 Min. aſunder: but if it be more than the ſaid Sine, then the former difference is the Sine of the exceſs above 90 Deg. 0 Min. unto which add 90 Deg. 0 Min. and the whole is the diſtance required.

Example of the Second.

The Iſland of St. *Thomas* under the Equinoctial Longitude 38 Deg. 0 Min. and *Java minor* Long. 151 Deg. 0 Min. and Lat. 8 Deg. 0 Min. difference of the Long. 113 Deg. 0 Min. the exceſs above 90 Deg. 0 Min. is 23 Deg. 0 Min. the Sine 3908, which added to 10000, the ſum is 13908, the Complement, of the Lat. given 82 Deg. 0 Min. the Sine is 9903, which multiplied by 13908, the Product is, cutting off 4 Figures, to the right hand 13773, from which Subſtract 9906 the Sine of the Complement of the Lat. the Remainer is 3870, the Sine of 22 Deg. 46 Min. unto which add 90 Deg. 0 Min. and the whole is 112 Deg. 46 Min. which multiplied by 60, and 46 Min. added, 6766 Miles, the diſtance of the two places.

Example of the Third.

Nova Zembla Lon. 83 Deg. 29 Min. and Lat. 74 Deg. 0 Min. and New *Plimouth* in New *England*, Long. 305 Deg. 0 Min. and Latit. 41 Deg. 37 Min. leſſer Latitude added to the Complement of the greater, the Sum is 57 Deg. 37 Min. whoſe Sine is 8445, the difference of Long. 128 Deg. 29 Min. the exceſs above 90

Deg. 0 Min. is 38 deg. 29 min. whose ſine is 6223, which added to 10000, that ſum is 106223; which multiplied by 7476, the ſine of the Complement of 41 d g. 37 min. the Product is 12128, and this multiplied again by 2756, the ſine of the Complement of 74 deg. 0 min. the laſt Product is 3342, which ſubſtracted from that ſine of the ſum of one Latitude, and added to the Complement of the other Latitude, *viz.* the ſine of 57 deg. 37 min. that is, 8445, and the remainer is 5103, the ſine of 30 deg. 41 min. whoſe Complement is 59 deg. 19 min. which being multiplied by 60, makes 3559 miles, the diſtance required.

The ingenious Mariners may Sail by knowing the true Longitude and Latitude of places, to any place aſſigned, as well by a blank of paper or paſtboard, as by his *Sea-Card*, by the help of a Protractor.

For Example.

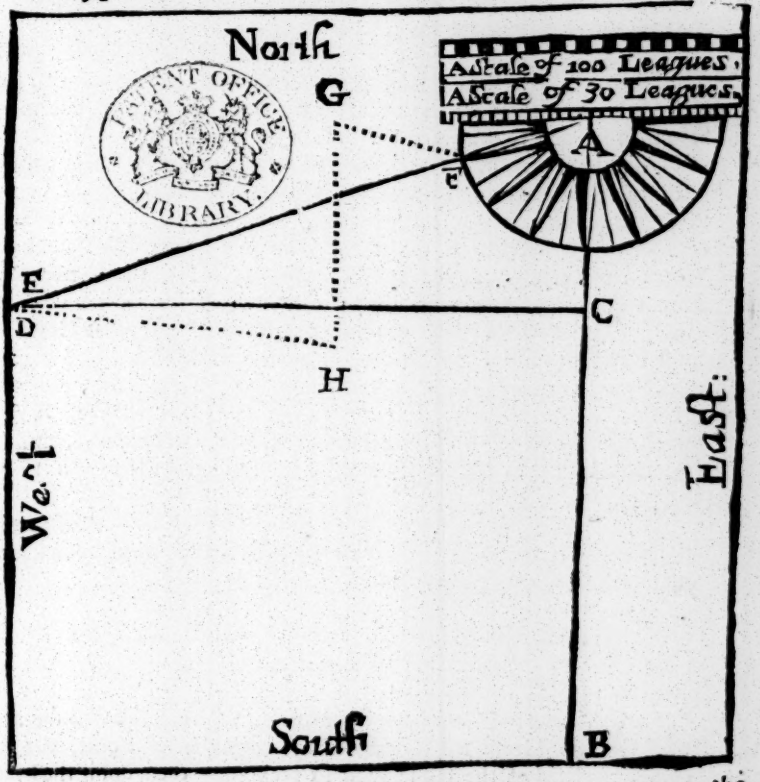
A Ship being at *Lizard* in the Southweſt parts of *England*, whoſe Longitude and Latitude I find in the Table to be 18 degrees 30 min. and 50 degrees 10 minutes, is bound for an Iſland in the Ocean Sea called *Maida*, whoſe Longitude I find in the ſame Table to be 2 degrees 40 minutes, and Latitude 46 degrees 40 minutes, the difference of their Latitude is 3 degrees 30 minutes, which is 210 miles or 70 Leagues: Therefore from the prick or point *A*, I draw the line *A B* in the Traverſe-board here adjoyning, and upon the point *A* I place the Center of the Protractor, being one half of the Mariners Compaſs, the middle point whereof repreſenting the North or South (as occaſion ſerves) I lay upon the line *A B*, and applying 70 Leagues, (whereof the Scale on the edge of the Protractor contains 100) from *A* towards *B*, where the ſaid 70 ends, I make a prick marked with *C*, ſo is *A C* 70 Leagues, the diſtance between the *Lizard* and the parallel of *Maida*; then from *C* I draw the line *C D* at right angles to *A B*, and by the former Chapter I find the diſtance betwixt *Maida* and the Meridian of the *Lizard* to be 629 miles, or 209 leagues and two miles; which by the Scale aforeſaid applied to the line *C D*, at the end of the diſtance I ſet a prick marked with *E*, ſo is the line *C E* 209 $\frac{2}{3}$ leagues, the diſtance that *Maida* is to the Weſtward of the Meridian of the *Lizard*, or the line *A B*, then the Protractor lying as at the firſt, I lay a Ruler from the Center thereof to the laſt prick *E*, and with the former

Scale

Scale meaſuring along by the edge of the Ruler from *A* the firſt prick, to *E* the laſt, I find the diſtance to be 222 leagues, and the Ruler cuts the Point W. and by S. and a half Point to the Southw. So I conclude the Iſle of *Maida* to be diſtant from the *Lizard*, 222 Leagues, and the direct Courſe Weſt and by South, and half a Point Southwards.

But if the Wind be ſcant or contrary, ſo that you cannot Sail by

The Type of a Traverſe-Board *and a* Protractor.



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the direct Course; then must you keep a reckoning how many Leagues you Sail upon every point; and where you change your Course, there place the Centre of the Protractor, keeping the Meridian, or North or South Line of the Protractor parallel to the Meridian drawn on the Traverse-Board, and laying a Rule from the Centre of the Protractor along that Point upon which the Ship maketh her way, and to the edge of the Ruler so placed, apply so many Leagues of the Scale, as the Ship hath sailed upon that Point, and then where that number ends, set a prick for the place where the Ship then is, and again upon that Prick or place the Centre of the Protractor lieth as before, the South and North Line thereof parallel to the Meridian, or South Line first drawn, and then laying a Ruler to the Center of the Protractor, being the place where the Ship then is, and to the place assigned, it shews upon the Protractor that Point how they bear: and that Scale applied thereto, shews the distance, as in the former Example: Having sailed upon the *Lizard* in the right Course 50 Leagues being in the point *F*, the Wind cometh to another Point, so that she maketh her way West and by North 40 Leagues, at the ends of which Course is the Letter *G*, from thence she runneth South 75 Leagues; at the end of which Course is *H*: then from *H*, to know the distance, and what Course must be kept to the prefixed place of *Maida*, marked with *F*, I place the Centre of the Protractor upon *H*, and the edge thereof, which is then North and South parallel or equidistant to the first Line, *A B*, which so placed, I lay a Ruler from the Centre thereof to *E*, and I find the Course to the West, and half a Point to the North 125 Leagues.

Note, that it is necessary to have upon your Protector two several Scales, a greater and a lesser; for the greater the Scale is you keep your reckoning by, the truer shall your Accompts be.

How to keep a more exact Accompt of the Voyage by the Traverse-Table.

THis *Traverse-Table* hath Four parts, wherein the Rumbs are reckoned from the Meridian, by every quarter Point, beginning at the head of the Table, and so reckoning them upon the head of the Tables, it comes to the Fourth Rumb, and then the Rumbs

are

are reckoned at the bottom of the Tables back again. The Margin or ſide of the Table, ſhews the Leagues ſailed; and the middle part ſhews how much you have Sailed either Eaſt or Weſt from the Meridian: or North or South from the Latitude, according to the Letters *E. W. N. S.* at the top and bottom of the Tables, which Table is caſt up according to the 12 and 13 Propoſitions following.

For Example.

Suppoſe a Ship ſails 50 Leagues or Miles South Weſterly upon the ſixth Rumb and an half; I would know how much I am to the Weſt-ward, and how much to the South-ward. For this look into the Table, and in the ſecond part thereof, at the bottom of the Table I find 6 Rumbs ½; and againſt 50 in the ſide, I find the numbers 47,84, and 14,50, as they ſtand here in the Margin. Now becauſe the Rumb of the Courſe ſtands at the bottom of the Table, I obſerve how the Letters ſtand, and they ſhew, that by this Courſe I am run 14 Leagues or Miles, and 50 parts or an half in Latitude to the Southwards, and 47 Leagues or Miles, and 84 parts; that is, almoſt 48 Leagues or Miles to the Weſtward from the Meridian I ſailed from. But now, if the Ships Courſe had been one Rumb from the Meridian, as it is at the top of this part of the Table, then you muſt have accounted according to the Letters at the top of the Table, *viz.* Southerly 47 Leagues 84 parts, and Weſterly 14 Leagues 50 parts.

1 Rumb ½	
N S	E W
4784	1450
E W	N S
6 Rumb ½	

And thus any particular Courſe being found, you may ſet it upon the plain *Chart* by the Latitude and departure from the Meridian, by laying a Ruler to the ſaid Latitude and Longitude in any little Draught, better than a Protractor with a large Scale.

But when you have occaſion to run ſeveral Courſes, as you muſt in moſt Voyages; your beſt way will be to keep a reckoning of them in ſuch a like Table as this following.

The

The Planes	The course.	Rumb	Distan. fro the Merid.	Run. L. pts.	North L. pts.	South L. pts.	East L. pts.	West L. pts.	Latit. D. M.	Longit. D. pts.
A shews the *Lizar.*									50 10	18 50
From *A* to *F*	S W	6 R ½	50	0		14 50		47 84	49 27	14 80
From *E* to *G*	N W	7 R	40	0	07 80			39 23	49 51	11 78
From *G* to *H*	South	0 R	75	0		75 0			46 61	11 78
From *H* to *E*	N W	7 R ½	1000		0980			9951		
			0200		0196			1990	46 422	74
			0050		0049			0407		
		Sum	2900		2005	8950		21145		

To explain this, take the laſt Example before mentioned in the *Traverſe-board*, wherein a Ship ſailing from the *Lizard* to the Iſland *Maida*, makes her firſt Courſe from * *A* to *F*. *W*. and by *S*. half a Point to the Southwards, that is, Southerly 6 Rumbs and an half. Now by the *Traverſe-Table*, I find for this Courſe (as before ſhewed) that the Ship hath ſailed to the Southwards 14 Leagues 50 parts, and to the Weſtward 47 Leagues 84 parts, which I ſet down according under the Columns South and Weſt.

* *See the* Traverſe-Board *which hath this Example upon it*, Pag. 113.

The ſecond Courſe the Ship makes is from *F* to *G*. which is W. and by N. 40 Leagues, that is, upon the 7 Rumb from the Meridian: And for this I find in the Table the Northing to be 7 Leagues 80 parts, and the Weſting to be 39 Leagues 23 parts, which I likewiſe ſet down under their reſpective Columns of North and Weſt.

The third Courſe in this Voyage is from *G* to *H*, being 75 Leag. South; this without farther trouble I ſet down under the Column of South.

The fourth Courſe is from *H* to *E* being Weſt, only half a Point to the North, which is 7 Rumbs and an half from the Meridian, the diſtance ſailed 125 Leagues, the Northing and Weſting whereof I take out of the Table at 3 times, becauſe it cannot be found in 1 line

line, and ſo ſet it down under the Columns North and Weſt, as you ſet in this Table. And here now caſting up the account, I find firſt that the Ship hath ſailed in all 290 leag. Secondly, finding in the North Column 20 leag. 5 parts, and in the South Column 89 leag. 5 parts, ſubſtracting the leſs from the greater, I find I am to the Southward 69 leag. 45 parts, which makes 3 deg. 28 m. which ſubſtracted from the Latitude of the *Lizard* 50 deg. 10 min. ſhews the Latitude I am in to be 46 deg. 42 min.

Thirdly, caſting up the Weſt Column, I find I am to the Weſtwards 211 l. 45 parts, that is, 634 miles: and by the former * Table I find, that in the Latitude of 4 d. which is about the middle Latit. that 40 miles 15 parts make one deg. of Long. by which dividing the ſaid 634 miles I find about 15 d. 80 parts, that is 15 d. 48 m. which ſubſtracted from the Long. of the *Lizard* 18 d. 30 m. there remains 2 deg. 42. min. So that I am very near the Iſland *Maida*, whoſe Long. is 2 deg. 40 min. and Lat. 46 deg. 40 min.

* Page 116. *ſhewing how many miles make a deg. in any Lat.*

But yet the Longitude may be more certainly known, if you caſt it up at every Courſe, which you may thus do exactly. If you keep your account in leagues, then 20 leagues making one degree, divide your leag. by 20, or take the half of your number of leagues, making the figures one place leſs, it ſhews the deg. and 100 parts. Thus in the firſt courſe the Weſterly diſtance from the Meridian being 47 l. 84 parts, yields 2 deg. 39 parts, which ſhould be the difference of longitude according to the plain Chart.

But becauſe the deg. of Longitude grow leſs as the Latitude increaſeth, you muſt proportion this by the middle Latitude, thus, as the ſine Complement of the middle Latitude of the Courſe is to the *Radius*, ſo the deg. and parts of Longitude of the plain Chart to the deg and parts of Longitude of the true Chart or Globe.

Thus for the courſe aforeſaid, the middle latitude being 49 d. 48 m. and the difference from the Merid. 2 d. 39 parts of the plain Chart:

As ſine compl. 49 d. 48 m. to 90 d. So 2 d. 39 pts, to 3 d. 70 pts.

6454 10000 2, 39 3, 70

And thus you may find the true longit. of any courſe, as exactly, and with as little trouble as any other way, and ſo find out your Longitude and Latitude all along your Voyage.

If you deſire to be more fully inſtructed herein, you may ſee this applied to all kinds of Sailings, in my Book called the *Advancement*

Leagues or miles sailed.	0 R ¼ 2 d. 49 m. N	S	E	W	0 R ½ 5 d. 38 m. N	S	E	W	0 R ¾ 8 d. 36 m. N	S	E	W	1 Rumb. 11 d. 15 m. N	S	E	W	Leagues or miles sailed.
1	00	00	00	05	00	99	00	10	00	99	00	15	00	98	00	20	1
2	01	00	00	10	01	99	00	20	01	98	00	29	01	96	00	39	2
3	02	00	00	15	02	98	00	29	02	97	00	44	02	95	00	58	3
4	03	00	00	20	03	98	00	39	03	96	00	59	03	92	00	78	4
5	04	00	00	25	04	97	00	49	04	95	00	73	04	90	00	98	5
6	05	00	00	29	05	97	00	59	05	94	00	88	05	88	00	176	6
7	06	00	00	34	06	97	00	69	06	92	01	03	06	86	01	377	7
8	07	00	00	39	07	96	00	78	07	91	01	17	07	85	01	568	8
9	08	00	00	44	08	96	00	88	08	90	01	32	08	83	01	709	9
10	09	00	00	49	09	95	00	98	09	89	01	47	09	81	01	95	10
20	19	97	00	98	19	90	01	96	19	78	02	93	19	61	03	90	20
30	29	96	01	47	29	85	02	94	29	67	04	40	29	41	05	85	30
40	39	95	01	96	39	80	03	92	39	56	05	86	39	22	07	80	40
50	49	94	02	45	49	75	04	90	49	45	07	33	49	03	09	75	50
60	59	92	02	94	59	71	05	88	59	35	08	80	58	84	11	70	60
70	69	91	03	43	69	66	06	86	69	24	10	27	68	65	13	65	70
80	79	90	03	92	79	61	07	84	79	13	11	73	78	46	15	60	80
90	89	89	04	41	89	56	08	82	89	02	13	20	88	27	17	55	90
100	99	87	04	90	99	51	09	80	99	91	14	67	98	08	19	50	100
200	199	86	09	80	199	02	19	60	199	82	29	34	196	16	39	00	200
	E	W	N	S	E	W	N	S	E	W	N	S	E	W	N	S	
	87 d.		11 m.		84 d.		22 m.		81 d.		34 m.		78 d.		45 m.		
	7 R ¼				7 R ½				7 R ¾				7 Rumb.				

Leagues or miles sailed.	1 R ¼ 14 d. 4 m. N	S	E	W	1 R ½ 16 d. 52 m. N	S	E	W	1 R ¾ 19 d. 41 m. N	S	E	W	2 Rumb. 22 d. 30 m. N	S	E	W	Leagues or miles sailed.
1	00	97	00	24	00	96	00	29	00	94	00	33	00	92	00	38	1
2	01	94	00	48	01	91	00	58	01	88	00	67	01	85	00	76	2
3	02	91	00	37	02	87	00	87	02	82	01	01	02	77	01	15	3
4	03	88	00	97	03	83	01	16	03	77	01	35	03	70	01	53	4
5	04	85	01	21	04	78	01	45	04	71	01	68	04	62	01	94	5
6	05	82	01	46	05	74	01	74	05	65	02	02	05	54	02	306	6
7	06	79	01	70	06	70	02	03	06	59	02	36	06	47	02	637	7
8	07	76	01	94	07	65	02	32	07	58	02	69	07	39	03	068	8
9	08	73	02	19	08	61	02	61	08	47	03	03	08	31	03	449	9
10	09	70	02	43	09	56	02	90	09	41	03	37	09	24	03	83	10
20	19	40	04	85	19	13	05	80	18	83	06	73	18	47	07	65	20
30	29	10	07	28	28	70	08	70	28	24	10	10	27	71	11	48	30
40	38	80	09	71	38	27	11	61	37	66	13	47	36	95	15	30	40
50	48	50	12	14	47	84	14	50	47	07	16	84	46	19	19	13	50
60	58	20	14	57	57	41	17	41	56	14	20	21	55	43	22	36	60
70	67	90	17	00	66	98	20	31	65	90	23	58	64	67	26	78	70
80	77	60	19	43	76	55	23	22	75	32	26	95	73	91	30	61	80
90	87	30	21	86	86	12	26	12	84	73	30	32	83	14	34	44	90
100	97	00	24	29	95	69	29	02	94	15	33	68	92	38	38	26	100
200	194	00	48	58	191	38	58	04	188	30	67	36	184	76	26	52	200
	E	W	N	S	E	W	N	S	E	W	N	S	E	W	N	S	
	84 d.		56 m.		22 d.		7 m.		70 d.		19 m.		97 d.		30 m.		

Leagues or miles sailed	2 R ¼ — 25 d. 29 m.				2 R ⅓ — 28 d. 7 m.				2 R ¾ — 30 d. 56 m.				3 Rumb. — 33 d. 45 m.				Leagues or miles sailed
	N	S	E	W	N	S	E	W	N	S	E	W	N	S	E	W	
1	00	90	00	43	00	88	00	47	00	86	00	51	00	83	00	55	1
2	01	87	00	85	01	76	00	94	01	71	01	03	01	66	01	11	2
3	02	71	01	28	02	54	01	41	02	57	01	54	02	49	01	67	3
4	03	61	01	71	03	43	01	88	03	43	02	06	03	32	02	22	4
5	04	52	02	14	04	31	02	36	04	29	02	57	04	16	02	78	5
6	05	42	02	56	05	29	02	83	05	15	03	08	04	99	03	33	6
7	06	33	02	99	06	17	03	30	06	00	03	60	05	82	03	89	7
8	07	23	03	42	07	05	03	77	06	86	04	11	06	65	04	44	8
9	8	14	03	85	07	94	04	24	07	72	04	63	07	48	05	00	9
10	09	04	04	28	08	82	04	71	08	58	05	14	08	31	05	55	10
20	18	07	08	55	17	63	09	42	17	15	10	28	16	62	11	11	20
30	27	11	12	82	26	45	14	14	25	73	15	42	24	94	16	66	30
40	36	15	17	10	35	27	18	85	34	30	20	56	33	29	22	22	40
50	45	19	21	37	44	09	23	56	42	88	25	70	41	57	27	77	50
60	54	23	25	62	52	91	28	28	51	46	30	84	49	88	33	33	60
70	63	27	29	92	61	73	32	99	60	04	35	98	58	20	38	88	70
80	72	31	34	20	70	55	37	71	68	61	41	12	66	51	44	44	80
90	81	35	38	47	79	37	42	43	77	19	46	26	74	83	50	00	90
100	90	39	42	75	88	19	47	13	85	77	51	41	83	14	55	55	100
200	180	78	85	50	176	38	94	26	171	54	102	82	166	28	11	11	200
	E W		N S		E W		N S		E W		N S		E W		N S		
	64 d.		41 m.		61 d.		52 m.		59 d.		04 m.		56 d.		15 m.		
	5 R ¼				5 R ⅓				5 R ¼				5 Rumb.				

Leagues or mil. sailed	3 R ¼ — 36 d. 34 m.				3 R ⅓ — 39 d. 22 m.				3 R ¾ — 42 d. 11 m.				4 Rumb. — 45 d. 05 m.				Leagues or mil. sailed
	N	S	E	W	N	S	E	W	N	S	E	W	N	S	E	W	
1	00	81	00	60	00	77	00	63	00	74	00	67	00	71	00	71	1
2	01	61	01	19	01	55	01	27	01	48	01	34	01	41	01	41	2
3	02	41	01	79	02	32	01	90	02	22	02	01	02	12	02	12	3
4	03	21	02	38	03	09	02	54	02	96	02	69	02	83	02	83	4
5	04	02	02	98	03	86	03	17	03	70	03	36	03	54	03	54	5
6	04	82	03	57	04	64	03	81	04	44	04	03	04	24	04	24	6
7	05	62	04	17	05	41	04	44	05	18	04	70	04	95	04	95	7
8	06	43	04	76	06	18	05	07	05	93	05	47	05	66	05	66	8
9	07	23	05	36	06	96	05	71	06	67	06	04	06	36	06	36	9
10	08	03	05	96	07	73	06	34	07	41	06	72	07	07	07	07	10
20	16	06	11	91	15	46	12	68	14	81	13	43	14	14	14	14	20
30	24	09	17	87	23	19	19	03	22	22	20	14	21	21	21	21	30
40	32	12	23	82	30	92	25	37	29	63	26	86	28	28	28	28	40
50	40	16	29	78	38	65	31	71	37	04	33	57	35	35	35	35	50
60	48	19	35	74	46	38	38	06	44	45	40	29	42	42	42	42	60
70	56	22	41	69	54	11	44	41	51	85	47	02	49	49	49	49	70
80	64	25	47	65	61	84	50	75	59	26	53	72	56	56	56	56	80
90	72	28	53	61	69	57	57	09	66	67	60	44	63	63	63	63	90
100	80	32	59	56	77	30	63	43	74	08	67	18	70	70	70	70	100
200	160	64	119	12	154	60	126	86	148	16	134	30	141	14	141	41	200
	E W		N S		E W		N S		E W		N S		E W		N S		
	53 d.		26 m.		50 d.		37 m.		47 d.		49 m.		45 d.		0 m.		

Here followeth a brief Table of Sines, *for* Arithmetical *Calculation, the total* Sine *whereof is* 10000, *with certain neceſſary Propoſitions to be wrought thereby; by which few things propoſed, and Examples thereto annexed, any one that hath either an ingenious Spirit, or a willing mind to the Practice of the* Mathematical Sciences *may attain to much knowledg therein.*

A brief Declaration of the ſame.

WHat the Table of Sines is, hath been very learnedly explained by others, and therefore needleſs it is for me to diſcourſe thereof; only take theſe few inſtructions for the help of thoſe, which as yet have no knowledg thereof. Firſt, know that Sailing, which is the principal thing here aimed at, is performed by a true and perfect knowledg of the Sphere, by the Projection whereof, all Calculation, Tables Calculated, and Inſtruments for Obſervations are invented, Protracted, framed and made.

What this Sphere is, I need not to diſcuſs, the chief or great Circles thereof conſiſting of 360 Degrees, and one quarter thereof being 90 Degrees, which quarter being taken from the whole Circumference, conſiſteth of theſe three particulars, *viz.* An Arch or part of a Circle being indeed 90 Degrees, or a quarter of the whole Circle, a right Angle, and two equal ſides thereto, of which the one is the Baſe or Ground Line, the other a Perpendicular let fall thereon at right Angles, the utmoſt ends or extenſions of which two Lines are the limits of the aforeſaid Arch or quarter of a Circle: the which three parts ſo fitted together in their due order, ſheweth the perfect Platform of one quarter of the whole Circle; commonly called a Quadrant: the Baſe or ground Line whereof being divided into 10000 equal parts, is *Sinus totus*, or the whole Sine: and the whole Arch or Quarter of a Circle into 90 Degrees, is the whole Arch belonging to the ſaid whole Sine.

Within which Quadrant any number of Degrees or Minutes counted from the beginning or firſt Perpendicular, may be called an Arch, or part of a Circle, and another Perpendicular let fall therefrom to the aforeſaid Baſe or Ground Line, the number of equal parts, that the ſaid Perpendicular falleth upon, is the right Sine to the

the Arch given: and the Complement of the Arch given, is the Remainer thereof, it being taken from 90 Degrees, or the whole Quadrant. To find out the right Sine of any given Arch, look in the head of the following Table for the Deg. thereof, and if there be any Minutes therewith, look for the Min. at the left ſide of the Table, and carrying your eye downwards from the Deg. till you come right againſt them in the number which you find in the common Angle to them both, is the right Sine of your given Arch deſired: As if you deſire the Sine of 35 Deg. 20 Min. look in the head of the Table for 35, and upon the left ſide thereof for 20, and in the common ſquare or Angle right againſt them both, you ſhall find 5783, which is the Sine of 35 Deg. 20 Min. and if you Subſtract 35 Deg. 20 Min. from 90 Deg. the Remainer 54 Deg. 40 Min. is the Complement thereof, whoſe right Sine (found as before is taught) is 8158: what the verſed Sine is, and how found out, is afterwards ſhewed; I doubt not but that theſe few words will ſuffice for the explaining of the Table following, whoſe large and ample uſes for *Navigation*, and other the *Mathematical* Practices, theſe following exemplary Propoſitions will in ſome reaſonable ſort make manifeſt: by which few here propoſed and anſwered, the ingenious may gather the manifold uſes thereof, being that indeed the benefit to be reaped thereby is great, and the Propoſitions to be wrought thereby infinite. Who ſo deſires more perfection in this kind of *Navigation*, and generally in all *Mathematical* Practices, let them ſpend ſome time in the ſtudy of *Pitiſcus* of the *Doctrine of Triangles*, not long ſince Tranſlated and Publiſhed in our *Engliſh* Tongue, by Mr. *Ralph Handſon*.

Certain Propoſitions to be wrought by the Table of Sines.

The Suns true Place being known, to find his Declination.

Prop. 1.

AS the whole Sine is to the Sine of the greateſt Declination, ſo is the Sine of the Suns diſtance from the neareſt Equinoctial Point, to the Sine of the Declination for the day propoſed.

Example.

Suppoſe the true place of the Sun to be in 20 Deg 36 Min. of *Taurus*, which is 50 Deg. 36 Min. from the beginning of *Aries*, or

the Vernal Equinoctial Point, therefore I muſt multiply the Sine of 50 Deg. 36 Min. the Suns diſtance from the Equinoctial Point, by the Sine of 23 Deg 32 Min. the greateſt Declination, and that Product muſt be divided by the whole Sine, whoſe ſeveral Sine being found out in the Table following, and ſet in order, the work will ſtand thus:

If 90 give 23. 32 what 50. 36?
10000 3993 7727 3085

Facit 3085, whoſe neareſt Arch 17 Deg. 58 Min. is the true Declination of the Sun, the day and year aforeſaid.

The Declination of the Sun given, to find his place in the Zodiack.

Prop. 3.

AS the Sine of the greateſt Declination is to the whole Sine, ſo is the Sine of the Declination for the day propoſed, to the Suns place or diſtance from the neareſt Equinoctial Point.

Example.

Suppoſe I find that the Declination of the Sun is 17 Deg. 58 Min. North, therefore I ſay:

If 23. 32 give 90 what 17, 58?
3993 10000 3083 7727

Facit neareſt 7727, whoſe Arch 50 Deg. 30 Min. is the Suns diſtance from the Vernal Equinoctial Point of *Aries*, from which taking 30 Deg. the whole Sine of *Aries*, the Remainer 20 Deg. 36 Min. ſhews the Sun to be ſo much entred into *Taurus*, which is the next Sine.

The Latitude of any place, and the Declination of the Sun given, to find the Amplitude.

Prop. 4.

AS the Sine of the Complement of the Latitude, is in proportion to the whole Sine, ſo is the Sine of the Suns Declination, to the Amplitude.

Example.

The Suns Declination being 11 Deg. 48 Min. North, I deſire the Amplitude of the Sun, *viz.* How much the Sun doth riſe and ſet from the true Eaſt and Weſt Points of the Horizon, towards the North or South in the Latitude of 51 Deg. 40 Min. to know which the work is thus:

If

If 38 Degrees 20 Minutes, the Complement of the Latitude given 90 Degrees, the Arch of the whole Sine; what gives 11 Degrees 48 Minutes the Declination of the Sun:

38 Degrees 20 Min.	90	11 Degrees 48 Min.
6202	1000	2045 3297

Facit 3297 neareſt, whoſe Arch ſought out in the Table of Sines, is 19 Deg. 15 Min. for the Amplitude of the Suns Declination propoſed: the ſame divided by 11 and one quarter, the number of Degrees that belongs to a Point of the Compaſs, ſheweth one Point and eight Deg. which the Sun riſes and ſets to the Northward of the Eaſt and Weſt, being that the Declination is North, for if the Declination were South, then were the Amplitude Southerly.

The Declination and Amplitude of the Sun given, to find the height of the Pole.

Prop. 5.

AS the Sine of that Amplitude is in proportion to the Sine of the Declination, ſo is the whole Sine, to the Sine of the Complement of the Latitude.

Example.

The Declination 11 Deg. 43 Min. and the Amplitude 19 Deg. 7 Min. I demand the height of the Pole? Say,

If 19. 7 give 11. 43? what 90?

3275	2031	10000	6202

Facit 6202 neareſt, whoſe Arch in the Table of Sines being 38 Deg. 40 Min. is the height of the Equinoctial, or the Complement of the Latitude: that ſubſtracted from 90 Deg. leaves 51 Deg. 40 Min. for the height of the Pole, or Latitude of the place deſired.

The true place and Declination of the Sun given, to find the Right Aſcenſion.

Prop. 6.

AS the Sine of the Complement of the Declination is to the total Sine, ſo is the Sine of the Complement of the Suns diſtance from the beginning of *Aries* to the Complement of the Right Aſcenſion.

Example.

Example.

I desire the Right Ascension of the Sun being in 10 Deg. 14 Min. of *Taurus*, in which place his Declination is 14 Deg. 56 Min. and the Complement thereof 75 Deg. 4 Min. and the distance from the beginning of *Aries* 40 Deg. 14 Min. whose Complement is 49 Deg. 46 Min. I say then,

If 75 54. give 90 what 49. 46 Minutes ?
9663 10000 7934 7900

Facit 7900 : whose Arch in the Table of Sines is 52 Degrees, 11 Min. the Complement whereof 37 Deg. 49 Min. is the Suns Right Ascension, the same converted into Hours by allowing 15 Deg. to an Hour, gives 2 Hours, 31 Min. 16 Seconds.

This is to be understood, when the Sun is betwixt the beginning of *Aries*, and the Tropick of *Cancer* ; for if the Sun be in the Tropick of *Cancer*, then is the Right Ascen. 90 Deg. or 6 Hours : And if the Sun be betwixt the Tropick of *Cancer*, and the Equinoctial Point of *Libra*, substract the distance that the Sun is from the beginning of *Aries*, out of 180 Deg. and with the Remainer work as before for the Right Ascension ; which Ascension so found, take from 180, and the remainer is the Right Ascen. desired ; But if the Sun be betwixt the Equin. of *Libra*, and the Tropick of *Capricorn*, substract the said distance from the beginning of *Aries* out of 180 Degrees ; and if betwixt the Tropick of *Capricorn*, and the beginning of *Aries*, take the said distance out of 360 Deg. and then work as before. One Example or two will make all this plain unto you.

The true place of the Sun being 17 Deg. 51 Min. of *Cancer*, is 107 Deg. 51 Min. from the beginning of *Aries*, which taken from 180, leaves 72 Deg. 9 Min. whose Complement is 17 Deg. 51 Min. the Suns Declination being then 22 Deg. 20 Min. the Complement thereof is 67 Deg. 40 Min. Say then,

If 67. 40 give 90 what 17. 51 Minutes ?
9250 10000 3065 3314

Facit 3314, whose Arch is 10 Deg. 21 Min. the Complement whereof 70 Deg. 39 Min. taken from 180, leaves 109 Deg 21 Min. for the Right Ascension desired, which converted into Hours, makes 7 Hours 17 Min. 24 Seconds. Again, I desire the Right

Ascension

Aſcenſion of 20 Deg. 40 Min. of *Capricorn*, whoſe diſtance is continual proceeding from the beginning of *Aries*, being 290 Deg. 40 Min. taken from 60; leaves 69 Deg. 20 Min. with the Complement, whereof 20 Deg. 40 Min. and the Complement of the Declination of the Sun upon the ſame Point of the Suns place 68 Deg. 6 Min. I work as followeth.

If 68. 6 give 90 what 20. 40 ?

9278 10000 3529 3803

Facit 3803, whoſe Arch is 22 Deg. 21 Minutes, the Complement whereof 67 Deg. 39 Min. taken from 360, leaves 292 Deg. 21 Min. for the Right Aſcenſion deſired, the ſame converted into Hours, is 19 Hours, 29 Min. 24 Seconds.

The Latitude and Declination of the Sun known, to find the difference Aſcenſional.

Prop. 6.

AS the Sine of the Complement of the Latitude, is to the Sine of the Latitude, ſo is the Sine of the Declination to the Quotient found: again, as the Sine of the Complement of the Declination, is to the whole Sine; ſo is the ſaid Quotient found, to the difference Aſcenſional.

Example.

I would know the difference Aſcenſional, when the Declination is 20 Deg. 6 Min. and the Latitude 51 Deg. 40 Min. I ſay,

If 38. 28 give 51. 40 what 20. 6 ?

9391 10000 3437 4346

Facit 4346, for the Quotient found. Then again, I ſay,

If 62. 54 give 90 what 4346 ?

9391 10000 4346 4627

Facit 4627, whoſe Arch in the Table of Sines 27 Deg. 34 Min. is the difference Aſcenſional for the day propoſed: the ſame reduced into Hours and Minutes, make 1 Hour 50 Min. which taken from 6 of the Clock, the Hour that the Sun riſeth, being in the Equinoctial, leaveth 4 Hours, 10 Min. at which time the Sun then riſeth, and the ſaid Aſcenſional difference added to 6 of the Clock, makes 7 of the Clock, 50 Min. for the Suns ſetting.

Again.

Again, the ſaid Aſcenſional difference doubled, and added to 12 Hours, the time from 6 in the Morning till 6 at Night, makes 15 Hours, 40 Min. for the whole length of the day.

This is when the Sun hath North Declination, for if the Declination be South, then the Aſcenſional difference added to 6 of the Clock, gives the Suns riſing; and taken from 6, leaves the ſetting; and being doubled, and taken from 12 Hours, leaves the length of the day, as aforeſaid.

The Amplitude and Difference Aſcenſional of the Sun or Star given, to find the Declination.

Prop. 7.

AS the Sine of the time of the Suns riſing, converted into Deg. and Min. is to the Sine of the Complement of the Amplitude, ſo is the whole Sine to the Sine of the Complement of the Declination.

Example.

The difference Aſcenſional being 27 Deg. 34 Min. ſhews the Sun to riſe at 4 a Clock 10 Min. which converted into Degrees, makes 62 Deg. 30 Min. and the Amplitude being found, as before is ſhewed in the third Propoſition, is 33 Deg. 38 Min. and the Complement thereof 56 Deg. 24 Min. Say then,

If 62, 30 give 56, 22 what 96?

8870 8 26 10000 6386

Facit 6386, whoſe Arch 69 Deg. 50 Min. the Complement thereof 20 Deg. 10 Min. is the Declination deſired.

The Latitude and Declination given, to find the Meridional Altitude.

Prop. 8.

IF the Sun hath North Declination, add the Complement of the Latitude to the Declination, the Product is the Meridional Altitude.

For Example.

If the Declination be 23 Deg. 30 Min. North, and the Latitude 51 Deg. 48 Min. the Complement thereof 38 Degrees 20 Min. added to 23 Deg. 30 Min. makes 61 Deg. 50 Min. for the Meri-

dian

ridian Altitude: But if the Meridian Altitude be 23 deg. 30 min. South, and the Latitude 51 deg. 40 min. ſubſtract 23 deg. 30 min. the declination from 38 deg. 20 min. the Complement of the Latitude, and the remainer 14 deg. 15 min. is the Altitude deſired: and if the Sun be in the Equinoctial having no Declination, then is the Meridian Altitude equal to the Complement of the Latitude.

The Latitude and Declination known, to find the height of the Sun at any hour of the day.

Prop. 9.

Firſt, you are to conſider, whether the Sun be in the Equinoctial, or whether he hath North or South Declination; for if the Sun be in the Equinoctial, then as the whole Sine is to the Sine of the Complement of the Latitude, ſo is the Sine of the Complement of the Suns diſtance from noon (allowing 15 deg. for every hour) to the Sine of the Altitude deſired.

Example.

At any year 0. day the Sun then having no Declination, the Latitude 51 deg. 40 min. I deſire the Suns height at 9 a clock before noon, or at 3 afternoon. The Complement of the Latitude is 38 deg. 20 min. and the hours diſtance from noon 45 deg. whoſe Complement is alſo 45 deg. Say then,

If 90 give 38 20 what 45?

10000 6201 7071 4385

Facit 4385, whoſe Arch 26 deg. is the height of the Sun above the Horizon, at the time and place propoſed.

If the Sun have Declination, then is the working ſomewhat more, except only at 6 a clock either before or after noon: for which hour, as the whole Sine is to the Sine of the Latitude; ſo is the Sine of the Declination, to the Sine of the Altitude.

Example.

The Latitude being 51 deg. 40 min. the Declination 11 deg. 48 min. Say,

If 90 give 51 40 what 11 48?

10000 7844 2045 1604

Facit 1604, whoſe Arch 9 deg. 14 min. is the Altitude deſired.

But for any other hour of the day, work as followeth; if it be in the forenoon, ſubſtract the hour given out of 12 hours, and reduce the remainer into deg. and if the remainer be leſs than 6 hours, ſeek the Sine Complement of it, and ſubſtract it out of 10000, and keep the remainer: But if the former remainer be more than 6 hours, ſubſtract 6 hours from it, and keep the Sine of the remainer, and add it to 1000, and keep the ſum: then multiply the firſt remainer kept, or this laſt ſum kept, by the Sine of the Complement of the Declination, cutting off four Figures to the right hand from the Product, and multiply the Product by the Sine of the Complement of the Latitude, cutting off alſo four Figures to the right hand from the Product, and this laſt Product ſubſtract from the Sine of the Meridian Altitude of the Sun, and the remainer is the Sine of the Suns Altitude required.

You are to Note, if the hour given be after noon, you muſt take the hour given it ſelf, and obſerve as before, whether it be more or leſs than 6 hours.

Exampl.

Any day or year at 9 of the clock, Latitude 51 deg. 30 min. Declination 11 deg. 43 min. North, ſubſtract 9 from 12, the Remainer is 3, that being reduced, is 45 deg. 0 min. whoſe Sine Complement is 7071, which ſubſtracted from 10000, the Remainer is 2929, which multiplied by 9791, the Sine Complement of the Declination 78 deg. 17 min. the Product is 2867, and this Product multiplied by 6225, the Sine Complement of the Latitude, the laſt Product is 1784. Now the Meridian Altitude is 50 deg. 13 min. whoſe Sine is 7685, from which ſubſtract the former number, the remainer is 5901, the Sine of 36 deg. 9 min. the Suns Altitude required.

To find the Suns Azimuth, having the Declination and Altitude of the Sun, and the height of the Pole given.

Prop. 10.

ADd the Complement of the Latitude to the Suns Altitude, and from the Sine of that ſum, ſubſtract the Sine of the Suns Declination, and keep the Remainer, when the Sun hath North Declination;

clination; but if the Sun hath South Declination, add the Sign of the Declination, to the Sine of that ſum, and keep the whole ſum, which remainer or ſum, multiply by the 10000 for the dividend, and multiply the Sine of the Complement of the Suns Altitude, by the Sine of the Complement of the Latitude for the Diviſor, cutting off four Figures to the right hand from the Product, by which Diviſor divide the former divident, and if the Quotient be leſs than 10000, ſubſtract it from 100000, and the remainer is the Sine of the Azimuth from the Eaſt or Weſt Northward: But if the Quotient be more than 10000, ſubſtract 10000 from it, and the remainer is the Sine of the Azimuth from the Eaſt or Weſt Southwards.

Note, if the Sun have no Declination, then the Sine of the ſum of the Suns Altitude, and the Complement of the Latitude muſt be multiplied by 10000 for the Dividend, and the Diviſor muſt be as before.

Example.

The Sun having 13 Deg. 0 Minutes North Declination in Latitude 51 deg. 30 min. being 43 deg. 0 min. high in the forenoon, I demand the Azimuth? The ſum of the Suns Altitude and the complement of the Latitude 81 deg. 30 min. the ſine 9890, and the ſine of the Declination 2249, the difference 7644, which multiplied by 10000 for the dividend, is 76410000, the ſine of the Complement of the Altitude, is 7313, which multiplied by 6125, the ſine of the Complement of the Latitude, the Product is 4552 for the Diviſor, and the Quotient is 16789, from which 10000 ſubſtracted, the remainer is 6789, the ſine of 42 deg. 44 min. the Suns Azimuth from the Eaſt, Southwards.

For the better underſtanding of this Propoſition, take theſe five Caſes of Mr. *Handſon*.

1. *For the Suns Azimuth having no Declination.*

ADd the Complement of the Latitude to the Complement of the *Almicanter*, which if the total be more than a Quadrant, ſubſtract 90, and ſet down the Sine of the Remainer for the firſt number. Again, add the Complement of the Latitude

and the *Almicanter*, and add the Sine thereof to the former, from the one half of that total ſubſtract your firſt number or Sine, and ſet down the Remainer: Then,

As the ½ of the two firſt Numbers added, is in proportion to the whole Sine; ſo is the ſaid remainer to the Sine of the Suns true *Azimuth*.

Example.

Lat. 51 *d.* 30′ the complement 38 *d.* 30′ } Added makes 108 *d.* 30′
Almicanter 20 Complement 70 *d.* 0′ } 90 ſub. leaves 18 *d.* 30′
whoſe Sine 3173 is the firſt Number. Again, Complement of the *Latitude* 38 *d.* 30′, *Almicanter* 20 *d.* added makes 58 *d.* 30′ whoſe Sine 8526 is the ſecond Number, thoſe two Numbers added makes 11699 the ½ thereof 5849, from which ſubſtract 3173 the firſt Numbers, reſts 2676 for the Remainer: Then ſay,

As 5849, the ½ of the two firſt Numbers, is to 10000, the whole Sine ſo is 2676, the remainer, to the *Azimuth* deſired.

Facit 4575, whoſe Arch 27 deg. 17 min. is the *Azimuth* from the Eaſt, Southward.

2. *When the Sun hath North Declination, the two Complements being equal to a Quadrant.*

ADd the Complement of Latitude with the *Almicanter* only, and from ½ the Sine thereof, ſubſtract the Sine of the Declination, and ſetting down the remainer.

As the ½ aforeſaid, is to the whole Sine; ſo is the remainer aforeſaid, to the Sine of the *Azimuth* deſired.

3. *When the Sun hath North Declination, the two Complements leſs than a Quadrant.*

ADd the Complement of the Latitude, and the Complement of the *Almicanter*, ſetting down the Sine of the Complement thereof; then add the *Almicanter*, and the Complement of the Latitude, and from the Sine thereof ſubſtract the former, ſetting down half of the remainer for the firſt found number: Again, ſubſtract the Sine of the firſt Complement from the Sine of the Declination,

nation, and the remainer thereof: Again, ſubſtract from your firſt found number, and ſet the remainer thereof down for your ſecond number: and then,

As the firſt found is to the whole Sine; ſo is the ſecond, to the *Azimuth* deſired.

4. *When the Sun hath North Declination, and the two Complements more than a Quadrant.*

ADd the Complement of the Latitude, and the Complement of the *Almicanter*, which being more than 90, ſubſtract 90, and ſet down the Sine of the Remainer, then add the *Almicanter*, and complement of the Latitude, and ſet down the line thereof, add both the Sines together, and take the half thereof for the firſt found number, then to the Sine of the firſt two Complements, add the Sine of the Declination, and from that total ſubſtract the firſt found, and ſet down the Remainer for the ſecond found; and then,

As the firſt found, is to the whole Sine; ſo is the ſecond found to the Sine of the *Azimuth* deſired.

5. *When the Sun hath South Declination, and the two Complements more than a Quadrant.*

ADd the Complements, ſubſtract 90, ſet down the Sine of the remainer, add alſo the *Almicanter*, and the Complement of Latitude, add both their Sines, and ſet down half the total for the firſt found, then ſubſtract the Sine of the Declination for the Sine of the remainer of the firſt two Complements, and that remainer again from the firſt found, which laſt remainer ſet down, and ſay,

As the firſt found, is to the whole Sine; ſo is the ſecond found, to the Sine of the *Azimuth* deſired.

The Latitude given, how many Minutes or Miles of the Equinctial make a Degree of Longitude in any Parallel.

Prop. 11.

AS the whole Sine is in proportion to 60, ſo is the Sine of the Complement of the Latitude, to the Miles anſwerable to a Degree in the Latitude deſired.

I desire to know how many miles in running East or West in the Latitude of 51 degrees 40 minutes, will alter one degree of Longitude? Say,

If 90 give 60, what 38. 20?
10000 60 6202 37

Facit 37 for the number of Miles answerable to a Degree in the Latitude desired.

The Course and Distance given, to find out the difference of Latitude.

Prop. 12.

AS the whole Sine is to the Miles of way run, so is the Sine of the Courses distance from East to West, to the minutes of difference of Latitude.

Example.

Running West South-west, which is 22 degrees 30 minutes from the West 75 Leagues, or 225 Miles; I demand the difference of Latitude? Say,

If 90 give 225 what 22. 30?
10000 225 3827 86

Facit 86 minutes, or 1 degree 26 minutes, for the difference of Latitude upon the said Course and Distance.

The Course and Distance given, to find the Difference of Longitude.

Prop. 13.

AS the whole Sine is to the Miles of way that you have run, so is the Sine of the Degree that your Course is distant from South or North, to the Miles that you are departed from your first Meridian.

Running North-west and by North, which is 33 deg. 45 minutes, from the North 60 Leagues, or 180 Miles; I demand the difference of Longitude? Say,

If 90 give 180, what 33. 45?
10000 180 5556 100

Facit 100 Miles which you are departed from the Meridian to the Westward, which if you divide by the number of Miles answerable to a deg. of Longitude, in the Latitude where you then find your self to be, the Quotient gives you the deg. and minutes of the difference of Longitude.

By

By the distance and departure from the Meridian given, to find the Course.

Prop. 14.

AS the Miles of distance that you have run, is in proportion to the whole Sine; so is the Miles of your departure from the Meridian, to the Sine of your Course from South or North.

Example.

Being departed from the first Meridian 75 Miles, in the running of 50 Leagues, or 150 Miles; I demand upon what Point I have sailed, it being betwixt South and West? say,

If 150 give 10000, what 75? 5000

Facit 5000, whose Arch 30 degrees, is the distance from South towards West, that the Course is, which is South-west and by South, and Southerly.

The Latitude, Declination, and height of the Sun given, to know the hour of the day.

Prop. 15.

SUbstract the sine of the Suns Altitude given out of the sine of the Suns Meridian Altitude (you may find the Meridian Altitude by the eighth Proposition foregoing) and Multiply the Remainder by 10000 for the Dividend; and Multiply the sine of the Complement of the Suns Declination, by the sine of the Complement of the Latitude for the Divisor; by which Divisor divide the former Dividend, and if the Quotient be more than 10000, substract 1000 from it, and the remainer is the sine of the hour wanting of 6 in the Forenoon, or the hour past 6 in the Afternoon: But if the Quotient be less than 10000, substract it from 10000, and the Remainer is the sine of the hour past 6 in the Forenoon, or wanting of 6 in the Afternoon.

Example.

Example.

In Latitude 51 deg. 30 min the Declination 15 deg. 0 min. North, the Altitude 43 deg. 0 min. in the forenoon, I demand the hour of the day; the Meridian Altitude 53 deg. 30 min. the Sine 8038, and the Sine of the Altitude given 6820, the difference 1218, the which multiplied by 10000, is 12180000 for the Dividend, the Sine of the Complement of Declination 9659, which multiplied by 6225, the Sine of the Compl. of the Latit. the Product is 6012, for the Divisor, and the Quotient is 2025, which substracted from 10000, the remainer is 7975, the Sine of 52 deg. 53 min. the hour past 6 in the morning, which being reduced, is 3 hou. 31 m. and an half added to 6, makes 9 of the clock, and 31 min. and an half, the hour of the day.

To find the Sinus Versus *of any given Arch.*

Prop. 16.

IF the Arch given be less than 90, substract it from 90, and the Sine of the remainer, taken from the total Sine, leaves the *Sinus Versus*; But if the given Arch be greater than 90 deg. substract 90 deg. therefrom, and seek the Sine of the Remainer, which is always the Complement of the given Arch; Which *Sinus* add to the whole Sine, and the Total thereof is the *Sinus Versus* of the given Arch desired.

Example.

To know the *Sinus Versus* of 47 deg. 12 min. the Complement thereof is 42 deg. 48 min. whose Sine 6794, taken from 10000, the whole Sine, resteth 3206, and reversed Sine 47 degrees, 12 minutes.

Likewise to know the reversed Sine of 137 deg. 25 min. which is more than 90 degrees, take 90 therefrom, there resteth 47 deg. 25 minutes, the *Sinus* whereof 7363 added to the whole Sine, maketh 17363 for the reversed Sine of 137 deg. 25 minutes.

A TABLE OF SINES

To a *Radius* of 10000.

A Table of Sines.

The Degrees of this Quadrant.

M	0	1	2	3	4	5	6	7	8	9	
1	3	177	352	526	700	874	1048	1222	1395	1567	59
2	6	180	355	529	703	877	1051	1224	1398	1570	58
3	9	183	35	53	706	880	1054	1227	1400	1573	57
4	12	186	361	535	709	883	1057	1230	1403	1576	56
5	14	189	363	538	712	886	1060	1233	1406	1579	55
6	17	192	365	542	715	889	1063	1236	1409	1582	54
7	20	195	369	544	718	892	1065	1239	1412	1584	53
8	23	198	372	547	721	895	1068	1242	1415	1587	52
9	26	201	375	549	724	898	1071	1245	1418	1590	51
10	29	204	378	552	726	900	1074	1247	1421	1593	50
11	32	206	381	555	729	903	1077	1250	1424	1596	49
12	35	209	384	558	732	906	1080	1253	1426	1599	48
13	38	212	387	561	735	909	1083	1256	1429	1602	47
14	41	215	390	564	738	912	1086	1259	1432	1605	46
15	44	218	393	567	741	915	1089	126	1435	1608	45
16	46	221	395	570	744	918	1091	1265	1438	1610	44
17	49	224	398	573	747	921	1094	1268	1441	1613	43
18	52	227	401	576	750	924	1097	1271	1444	1616	42
19	55	230	404	578	753	927	1100	1273	1446	1619	41
20	58	233	407	581	756	930	1103	1276	1449	1622	40
21	61	235	410	584	758	932	1106	1279	1452	1625	39
22	64	238	413	587	761	935	1109	1282	1455	1627	38
23	67	241	416	590	764	938	1112	1285	1458	1630	37
24	70	244	419	593	767	941	1115	1288	1461	1633	36
25	73	247	422	596	770	944	1118	1291	1464	1636	35
26	76	250	425	599	773	947	1120	1294	1467	1639	34
27	78	253	427	602	776	950	1123	1297	1469	1642	33
28	81	256	430	605	779	953	1126	1299	1472	1645	32
29	84	259	433	607	782	956	1129	1302	1475	1648	31
30	87	262	436	610	785	959	1132	1304	1478	1650	30
	80	88	87	86	85	84	82	82	8	80	M

A Table of Sines.

The Degrees of the Quadrant.

M	0	1	2	3	4	5	6	7	8	9	
31	90	265	439	613	787	961	1135	1308	1481	1653	29
32	93	268	442	616	790	964	1138	1311	1484	1656	28
33	96	270	445	619	793	957	1141	1314	1487	1659	27
34	99	273	448	622	796	970	1144	1317	1490	1662	26
35	102	276	451	625	899	973	1146	1320	1492	1665	25
36	105	279	454	628	802	976	1149	1322	1495	1668	24
37	107	282	456	631	805	979	1152	1325	1498	1670	23
38	110	285	460	634	806	982	1155	1328	1501	1673	22
39	113	288	462	637	811	985	1158	1331	1504	1676	21
40	116	291	465	640	814	988	1161	1334	1507	1679	20
41	119	294	468	642	816	990	1164	1337	1510	1682	19
42	122	297	471	645	819	993	1167	1340	1513	1685	18
43	125	300	474	648	822	996	1170	1343	1515	1688	17
44	128	302	477	651	825	999	1172	1346	1518	1691	16
45	131	305	480	654	828	1002	1175	1348	1521	1693	15
46	134	308	483	657	831	1005	1178	1351	1524	1696	14
47	137	311	485	660	834	1008	1181	1354	1527	1699	13
48	140	314	488	663	837	1010	1184	1357	1530	1702	12
49	142	317	491	666	840	1013	1187	1360	1533	1705	11
50	145	320	494	668	843	1016	1190	1363	1536	1708	10
51	148	323	497	671	845	1019	1193	1366	1538	1711	9
52	151	326	500	674	848	1022	1196	1369	1541	1714	8
53	154	329	503	677	851	1025	1198	1372	1544	1716	7
54	157	331	506	685	854	1028	1201	1374	1547	1719	6
55	160	334	509	683	857	1031	1204	1377	1550	1722	5
56	162	337	512	686	860	1034	1207	1380	1553	1725	4
57	166	340	515	689	863	1037	1210	1383	1556	1728	3
58	169	343	517	692	866	1040	1213	1386	1559	1731	2
59	172	347	520	695	869	1042	1216	1389	1561	1734	1
60	174	350	523	697	871	1045	1219	1391	1564	1736	0
	89	88	87	86	85	84	83	82	81	80	M

A Table of Sines.

The Degrees of the Quadrant.

M	10	11	12	13	14	15	16	17	18	19	
1	1739	1911	2082	2252	2422	2591	2759	2926	3093	3258	59
2	1742	1914	2085	2255	2425	2594	2762	2929	3096	3261	58
3	1745	1917	2088	2258	2428	2596	2765	2932	3098	3264	57
4	1748	1919	2090	2261	2430	2597	2767	2935	3101	3267	56
5	1751	1922	2093	2264	2433	2602	2770	2938	3104	3269	55
6	1754	1925	2096	2267	2436	2605	2773	2940	3107	3272	54
7	1757	1928	2097	2269	2439	2608	2776	2943	3108	3275	53
8	1759	1931	2100	2272	2442	2611	2779	2946	3112	3278	52
9	1762	1934	2102	2275	2445	2613	2781	2949	3115	3280	51
10	1765	1937	2105	2278	2447	2616	2784	2951	3118	3283	50
11	1768	1939	2110	2281	2450	2619	2787	2954	3120	3286	49
12	1771	1942	2112	2283	2453	2622	2799	2957	3123	3289	48
13	1773	1945	2117	2286	2456	2625	2793	2960	3126	3291	47
14	1776	1948	2119	2289	2459	2628	2795	2963	3129	3294	46
15	1779	1951	2121	2292	2462	2630	2798	2965	3132	3297	45
16	1782	1954	2125	2295	2464	2633	2801	2968	3134	3300	44
17	1785	1957	2127	2298	2467	2636	2804	2971	3137	3302	43
18	1788	1959	2130	2300	2470	2639	2807	2974	3140	3305	42
19	1790	1962	2133	2303	2473	2641	2809	2976	3143	3308	41
20	1793	1965	2136	2306	2476	2644	2812	2979	3146	3311	40
21	1796	1967	2139	2309	2478	2647	2815	2982	3148	3313	39
22	1799	1971	2142	2312	2481	2650	2818	2985	3151	3316	38
23	1802	1974	2145	2315	2484	2653	2821	2988	3154	3319	37
24	1805	1977	2147	2317	2487	2655	2823	2990	3156	3322	36
25	1808	1979	2150	2320	2490	2658	2826	2993	3159	3324	35
26	1810	1982	2152	2323	2492	2661	2829	2996	3162	3327	34
27	1813	1985	2156	2326	2495	2664	2832	2999	3165	3330	33
28	1816	1988	2159	2329	2498	2667	2835	3001	3167	3332	32
29	1819	1991	2161	2331	2501	2669	2837	3004	3170	3335	31
30	1822	1994	2164	2334	2504	2672	2840	3007	3173	3338	30
	79	78	77	76	75	74	73	72	71	70	M

A Table of Sines.

The Degrees of the Quadrant.

M	10	11	12	13	14	15	16	17	18	19	
31	1825	1996	2167	2337	2507	2675	2843	3010	3176	3341	29
32	1828	1999	2170	2340	2509	2678	2846	3013	3178	3343	28
33	1830	2002	2173	2343	2512	2681	2848	3015	3181	3346	27
34	1833	2005	2176	2346	2515	2683	2851	3018	3184	3349	26
35	1836	2008	2178	2349	2518	2686	2854	3021	3187	3352	25
36	1839	2011	2181	2351	2521	2689	2857	3024	3189	3354	24
37	1842	2014	2184	2354	2524	2692	2860	3026	3192	3357	23
38	1846	2016	2187	2357	2526	2695	2862	3029	3195	3360	22
39	1848	2019	2190	2360	2529	2698	2865	3032	3198	3363	21
40	1850	2022	2193	2363	2532	2700	2868	3035	3201	3365	20
41	1853	2025	2196	2365	2535	2703	2871	3037	3203	3368	19
42	1856	2028	2198	2368	2538	2706	2874	3040	3206	3371	18
43	1859	2031	2201	2371	2540	2709	2876	3043	3209	3374	17
44	1862	2034	2204	2374	2543	2712	2879	3046	3212	3376	16
45	1865	2036	2207	2377	2546	2714	2882	3049	3214	3379	15
46	1868	2039	2210	2380	2549	2717	2885	3051	3217	3382	14
47	1870	2042	2213	2382	2552	2720	2887	3054	3220	3385	13
48	1873	2045	2216	2385	2555	2723	2880	3057	3223	3387	12
49	1876	2048	2218	2388	2557	2726	2893	3060	3225	3390	11
50	1879	2051	2221	2391	2560	2729	2896	3062	3228	3393	10
51	1882	2053	2224	2394	2563	2731	2899	3065	3231	3396	9
52	1885	2056	2227	2397	2566	2734	2901	3068	3234	3398	8
53	1888	2059	2230	2399	2568	2737	2904	3071	3236	3401	7
54	1890	2062	2232	2402	2571	2740	2907	3073	3239	3404	6
55	1894	2065	2235	2405	2574	2743	2910	3076	3242	3406	5
56	1896	2068	2238	2406	2577	2745	2913	3079	3245	3409	4
57	1899	2070	2241	2411	2580	2748	2915	3082	3248	3412	3
58	1902	2073	2244	2414	2583	2751	2918	3085	3250	3415	2
59	1905	2076	2247	2416	2585	2754	2921	3087	3253	3417	1
60	1908	2079	2249	2419	2588	2756	1924	3090	3256	3420	0
	79	78	77	76	75	74	73	72	71	70	M

A Table of Sines.

The Degrees of the Quadrant.

M	20	21	22	23	24	25	26	27	28	29	
1	3423	3586	3748	3910	4070	4229	4386	4541	4697	4851	59
2	3426	3589	3751	3913	4073	4231	4389	4545	4700	4853	58
3	3428	3592	3754	3915	4075	4234	4391	4548	4702	4856	57
4	3431	3594	3757	3918	4078	4236	4394	4550	4705	4858	56
5	3434	3597	3759	3921	4081	4239	4396	4553	4707	4861	55
6	3437	3600	3762	3923	4083	4242	4399	4555	4710	4863	54
7	3439	3603	3765	3926	4086	4245	4402	4558	4713	4866	53
8	3442	3605	3768	3929	4089	4247	4404	4561	4715	4868	52
9	3445	3608	3770	3931	4091	4250	4407	4563	4718	4871	51
10	3447	3611	3773	3934	4094	4252	4410	4566	4720	4873	50
11	3450	3613	3776	3937	4096	4255	4412	4568	4723	4876	49
12	3453	3616	3778	3939	4099	4258	4415	4571	4725	4878	48
13	3456	3619	3781	3942	4102	4260	4418	4573	4728	4881	47
14	3458	3622	3784	3945	4104	4263	4420	4576	4731	4883	46
15	3461	3624	3786	3947	4107	4266	4423	4579	4733	4886	45
16	3464	3627	3789	3950	4110	4268	4425	4581	4736	4888	44
17	3467	3630	3792	3953	4112	4271	4428	4584	4738	4891	43
18	3469	3632	3794	3955	4115	4274	4431	4586	4741	4893	42
19	3472	3635	3797	3958	4118	4276	4433	4589	4743	4896	41
20	3475	3638	3800	3961	4120	4279	4436	4592	4746	4898	40
21	3477	3641	3803	3963	4123	4281	4438	4594	4748	4901	39
22	3480	3643	3805	3966	4126	4284	4441	4597	4751	4904	38
23	3483	3646	3808	3969	4128	4287	4444	4599	4754	4906	37
24	3486	3649	3811	3971	4131	4289	4446	4602	4756	4909	36
25	3488	3651	3813	3973	4134	4292	4449	4604	4759	4911	35
26	3491	3654	3816	3977	4136	4295	4451	4607	4761	4914	34
27	3494	3657	3819	3979	4139	4297	4454	4610	4764	4916	33
28	3497	3660	3821	3982	4142	4300	4457	4612	4766	4919	32
29	3499	3662	3824	3985	4144	4302	4459	4616	4779	4921	31
30	3502	3665	3827	3987	4147	4305	4462	4619	4771	4923	30
	69	68	67	66	65	64	63	62	61	60	M

A Table of Sines.

The Degrees of the Quadrant.

M	20	21	22	23	24	25	26	27	28	29	M
31	3503	3668	3829	3990	4149	4308	4464	4620	4774	4927	29
32	3507	3670	3832	3993	4152	4310	4467	4623	4777	4929	28
33	3510	3673	3835	3995	4155	4313	4470	4625	4779	4932	27
34	3513	3676	3837	3998	4157	4316	4472	4628	4782	4934	26
35	3516	3679	3840	4001	4160	4318	4475	4630	4784	4937	25
36	3518	3681	3843	4003	4163	4321	4478	4633	4787	4939	24
37	3521	3684	3846	4006	4165	4324	4480	4635	4789	4942	23
38	3524	3687	3848	4009	4168	4326	4483	4638	4792	4944	22
39	3527	3689	3851	4012	4171	4329	4485	4641	4794	4947	21
40	3529	3692	3854	4014	4173	4331	4488	4643	4797	4949	20
41	3532	3695	3856	4017	4176	4334	4490	4646	4799	4952	19
42	3535	3697	3859	4019	4178	4336	4493	4648	4802	4954	18
43	3537	3700	3862	4022	4181	4339	4496	4651	4805	4957	17
44	3540	3703	3864	4025	4184	4342	4498	4653	4807	4960	16
45	3543	3706	3867	4028	4186	4344	4501	4656	4810	4962	15
46	3546	3708	3870	4030	4189	4347	4503	4659	4812	4965	14
47	3548	3711	3872	4033	4192	4350	4506	4661	4815	4967	13
48	3551	3714	3875	4035	4194	4352	4509	4664	4817	4970	12
49	3554	3716	3878	4038	4197	4355	4511	4666	4820	4972	11
50	3556	3719	3880	4041	4200	4357	4514	4669	4822	4975	10
51	3559	3722	3883	4043	4202	4360	4516	4671	4825	4977	9
52	3562	3724	3886	4046	4205	4363	4519	4674	4828	4980	8
53	3565	3727	3888	4049	4208	4365	4522	4677	4830	4982	7
54	3567	3730	3891	4051	4210	4368	4524	4679	4833	4985	6
55	3570	3732	3894	4054	4213	4371	4527	4682	4836	4987	5
56	3573	3735	3896	4057	4216	4373	4529	4684	4838	4990	4
57	3575	3738	3899	4059	4218	4376	4532	4687	4840	4992	3
58	3578	3741	3902	4062	4221	4378	4535	4689	4843	4995	2
59	3581	3743	3905	4065	4224	4381	4537	4692	4845	4997	1
60	3584	3746	3908	4067	4226	4384	4540	4695	4848	5000	0
	69	68	67	66	65	64	63	62	61	60	

A Table of Sines.

The Degrees of the Quadrant.

M	30	31	32	33	34	35	36	37	
1	5002	5153	5302	5449	5594	5738	5880	6020	59
2	5005	5155	5304	5451	5597	5740	5882	6023	58
3	5007	5158	5306	5454	5599	5743	5885	6025	57
4	5010	5160	5309	5456	5601	5745	5887	6027	56
5	5012	5163	5311	5458	5604	5748	5890	6030	55
6	5015	5165	5314	5461	5606	5750	5892	6032	54
7	5017	5168	5316	5463	5609	5752	5894	6035	53
8	5020	5170	5319	5466	5611	5755	5896	6037	52
9	5022	5173	5321	5468	5614	5757	5899	6039	51
10	5025	5175	5324	5471	5616	5759	5901	6041	50
11	5027	5178	5326	5473	5618	5762	5904	6044	49
12	5030	5180	5329	5476	5621	5764	5906	6046	48
13	5032	5183	5331	5478	5623	5767	5909	6048	47
14	5035	5185	5334	5480	5625	5769	5911	6051	46
15	5038	5188	5336	5483	5628	5771	5913	6053	45
16	5040	5190	5339	5485	5630	5774	5915	6055	44
17	5042	5193	5341	5488	5633	5776	5918	6057	43
18	5045	5195	5343	5490	5635	5778	5920	6060	42
19	5048	5198	5346	5493	5638	5781	5922	6062	41
20	5050	5200	5348	5495	5640	5783	5925	6064	40
21	5053	5203	5351	5497	5642	5785	5927	6067	39
22	5055	5205	5353	5500	5645	5788	5929	6069	38
23	5058	5208	5356	5502	5647	5790	5932	6071	37
24	5060	5210	5358	5505	5650	5793	5934	6074	36
25	5063	5213	5361	5507	5652	5795	5936	6076	35
26	5065	5215	5364	5509	5654	5797	5939	6078	34
27	5068	5217	5366	5512	5657	5800	5941	6081	33
28	5070	5220	5368	5514	5659	5802	5943	6083	32
29	5073	5223	5370	5517	5662	5805	5946	6085	31
30	5075	5225	5372	5519	5664	5807	5949	6088	30
	59	58	57	56	55	54	53	52	M

A Table of Sines.

The Degrees of the Quadrant.

M	30	31	32	33	34	35	36	37	
31	5078	5227	5375	5522	5669	5809	5950	6090	29
32	5080	5230	5378	5524	5669	5812	5953	6092	28
33	5083	5232	5380	5527	5671	5814	5955	6094	27
34	5085	5235	5383	5529	5677	5816	5957	6097	26
35	5088	5237	5385	5531	5676	5819	5960	6099	25
36	5090	5240	5388	5534	5678	5821	5962	6101	24
37	5093	5243	5390	5536	568c	5823	5964	6104	23
38	5095	5245	5393	5539	5583	5826	5967	6106	22
39	5098	5247	5395	5541	5685	5828	5969	6108	21
40	5100	5250	5397	5543	5687	5831	5971	6110	20
41	5103	5252	5400	5546	5690	5833	5975	6114	19
42	5105	5255	5402	5548	5693	5835	5978	6117	18
43	5108	5257	5404	5551	5695	5838	598c	6119	17
44	5110	5260	5407	5553	5697	5840	5982	6121	16
45	5113	5262	5410	5556	5700	5842	5985	6123	15
46	5115	5265	5412	5558	5702	5845	5988	6124	14
47	5118	5267	5415	5560	5705	5847	5989	6127	13
48	5120	5269	5417	5563	5707	5849	5990	6129	12
49	5123	5272	5419	5565	5709	5852	5992	6131	11
50	5127	5274	5422	5568	5712	5854	5994	6134	10
51	5128	5277	5424	5570	5714	5856	5997	6136	9
52	5130	5279	5427	5573	5717	5859	5999	6138	8
53	5133	5282	5429	5575	5719	5861	6002	6140	7
54	5135	5284	5431	5577	5721	5864	6004	6143	6
55	5138	5287	5434	5580	5724	5866	6006	5145	5
56	5140	5289	5437	5583	5726	5868	6009	6147	4
57	5143	529[illegible]	5439	5585	5729	5871	6011	6149	3
58	5145	5294	5441	5587	5731	5873	6013	6152	2
59	5148	5297	5444	5589	5733	5875	6016	6154	1
60	5150	5299	5446	5592	5736	5878	5018	6152	0
	59	58	57	56	55	54	53	52	M

A Table of Sines.

The Degrees of the Quadrant.

M	38	39	40	41	42	43	44	45	
1	6159	6295	6430	6563	6694	6822	6949	7073	59
2	6161	6298	6432	6565	6696	6824	6951	7075	58
3	6163	6300	6434	6567	6698	6826	6953	7077	57
4	6166	6302	6437	6569	6700	6828	6955	7079	56
5	6168	6304	6439	6571	6702	6831	6957	7081	55
6	6170	6307	6441	6574	6704	6833	6959	7083	54
7	6173	6309	6443	6576	6706	6835	6961	7085	53
8	6175	6311	6446	6578	6708	6837	6963	7087	52
9	6177	6313	6448	6580	6711	6839	6965	7089	51
10	6179	6316	6450	6583	6713	6841	6967	7092	50
11	6182	6318	6452	6585	6715	6843	6969	7094	49
12	6184	6320	6454	6587	6717	6845	6972	7096	48
13	6186	6322	6457	6589	6719	6848	6974	7098	47
14	6189	6325	6459	6591	6721	6850	6976	7100	46
15	6191	6327	6461	6593	6724	6852	6978	7102	45
16	6193	6329	6463	6596	6726	6854	6980	7104	44
17	6195	6331	6466	6598	6728	6856	6982	7106	43
18	6198	6335	6468	6600	6730	6858	6984	7108	42
19	6200	6336	6470	6602	6732	6860	6986	7110	41
20	6202	6338	6472	6604	6734	6862	6988	7112	40
21	6205	6340	6474	6606	6736	6864	6990	7114	39
22	6207	6343	6477	6609	6738	6867	6992	7116	38
23	6209	6345	6479	6611	6741	6869	6994	7118	37
24	6211	6347	6481	6613	6743	6871	6997	7120	36
25	6213	6349	6483	6615	6745	6874	6999	7122	35
26	6216	6352	6486	6617	6747	6875	7001	7124	34
27	6218	6354	6488	6619	6749	6877	7003	7126	33
28	6220	6356	6490	6622	6752	6879	7005	7128	32
29	6223	6358	6492	6624	6754	6881	7007	7130	31
30	6225	6361	6494	6626	6756	6884	7009	7132	30
M	51	0	49	48	47	46	45	44	M

A Table of Sines.

The Degrees of the Quadrant.

M	38	39	40	41	42	43	44	45	
31	6227	6368	6497	5628	6758	6886	7011	7134	29
32	6230	6365	6499	6630	6760	6888	7013	7136	28
33	6231	6367	6501	6633	6752	6890	7015	7139	27
34	6234	6370	6503	6635	6764	6892	7017	7141	26
35	6236	6372	6505	6637	6756	6894	7019	7143	25
36	6239	6374	6508	6639	6769	6896	7021	7145	24
37	6241	6376	6510	6641	5771	6898	7023	7147	23
38	6243	6379	6512	6644	6773	6900	7026	7149	22
39	6245	6381	6514	6546	6775	6902	7028	7151	21
40	6248	6383	6516	6648	6777	5905	7030	7153	20
41	6250	6385	6519	6650	6779	6907	7032	7155	19
42	6252	6387	6521	6652	6781	6909	7034	7157	18
43	6255	6390	6523	6654	6783	6911	7036	7159	17
44	6257	6392	6525	6657	6786	6913	7038	7161	16
45	6259	6394	6527	6659	6788	6915	7040	7163	15
46	6261	6396	6530	6661	6790	6917	7042	7165	14
47	6264	6399	6532	6663	6792	6919	7044	7167	13
48	6265	6401	6534	6665	6794	6921	7046	7169	12
49	6268	6403	6536	6667	6796	6923	7048	7171	11
50	6270	6405	6539	6670	6799	6925	7050	7173	10
51	6273	6408	6541	6672	6801	6928	7052	7175	9
52	6275	6410	6543	6674	6803	6930	7054	7177	8
53	6277	6412	6545	6676	6805	6932	7057	7179	7
54	6279	6414	6547	6678	6807	6934	7059	7181	6
55	6282	6417	6550	6680	6809	6936	7061	7183	5
56	6284	6419	6552	6683	6811	6938	7063	7185	4
57	6286	6421	6554	6685	6813	6940	7065	7187	3
58	6289	6423	6556	6687	6816	6942	7067	7189	2
59	6291	6426	6558	6689	6818	6944	7069	7191	1
60	6293	6428	6560	6691	6820	6946	7071	7193	0
	51	50	49	48	47	46	45	44	M

A Table of Sines.

The Degrees of the Quadrant.

M	46	47	48	49	50	51	52	53	
1	7195	7315	7433	7549	7662	7773	7882	7988	59
2	7198	7317	7435	7551	7664	7775	7884	7990	58
3	7199	7319	7437	7553	7666	7777	7885	7992	57
4	7201	7321	7439	7555	7668	7779	7887	7993	56
5	720	7323	7441	7557	7670	7781	7889	7995	55
6	7205	7325	7443	7559	7672	7782	7891	7997	54
7	7207	7327	7445	7560	7673	7784	7893	7998	53
8	7209	7329	7447	7562	7675	7786	7894	8000	52
9	7211	7331	7449	7564	7677	7788	7896	8002	51
10	7213	7334	7451	7566	7679	7790	7898	8004	50
11	7215	7335	7453	756	7681	7791	7900	8005	49
12	7218	7337	7455	7570	7683	7793	7901	8007	48
13	7220	7339	7457	7572	7685	7795	7903	8009	47
14	7222	7341	7459	7574	7687	7797	7905	8011	46
15	7224	7343	7461	7576	768	7799	7907	8012	45
16	7226	7345	7463	7577	7690	7801	7909	8014	44
17	7228	7347	7464	7579	7692	7803	7910	8016	43
18	7230	7349	7466	7581	7694	7804	7912	8018	42
19	7232	7351	7468	7583	7696	7806	7914	8019	41
20	7234	7353	7470	7585	7698	7808	7916	8021	40
21	7236	7355	7472	7587	7700	7810	7918	8023	39
22	7238	7357	7474	7589	7701	7811	7919	8025	38
23	7240	7359	7476	7591	7703	7813	7921	8026	37
24	7242	7361	7478	7593	7705	7815	7923	8028	36
25	7244	7363	7480	7595	7707	7817	7925	8030	35
26	7246	7365	7482	7596	7709	7820	7927	8032	34
27	7248	7367	7484	7598	7711	7821	7928	8033	33
28	7250	7369	7486	7600	7712	7822	7930	8035	32
29	7251	7371	7488	7602	7714	7824	7932	8037	31
30	7254	373	7490	7604	7716	7826	7933	8038	30
	43	42	41	40	39	38	37	36	M

A Table of Sines.

The Degrees of the Quadrant.

M	46	47	48	49	50	51	52	53	
31	7256	7375	7491	7606	7718	7828	7935	8040	29
32	7258	7377	7492	7608	7720	7830	7937	8042	28
33	7260	7379	7495	7610	7722	7832	7939	8044	27
34	7262	7381	7497	7612	7724	7833	7941	8045	26
35	7264	7382	7499	7614	7725	7835	7942	8047	25
36	7266	7384	7501	7615	7727	7837	7944	8049	24
37	7268	7386	7503	7617	7729	7839	7946	8051	23
38	7270	7388	7505	7619	7731	7840	7948	8052	22
39	7272	7390	7507	7621	7733	7842	7949	8054	21
40	7274	7392	7509	7623	7735	7844	7951	8056	20
41	7276	7394	7511	7625	7737	7846	7953	8058	19
42	7278	7396	7513	7627	7739	7848	7955	8059	18
43	7280	7397	7514	7629	7740	7849	7956	8061	17
44	7282	7398	7516	7630	7742	7851	7958	8063	16
45	7284	7402	7518	7632	7744	7853	7960	8064	15
46	7286	7404	7520	7634	7746	7855	7962	8066	14
47	7288	7406	7522	7636	7748	7857	7963	8068	13
48	7290	7408	7524	7638	7750	7858	7965	8070	12
49	7292	7410	7526	7640	7751	7860	7967	8071	11
50	7294	7412	7528	7642	7753	7862	7969	8073	10
51	7296	7414	7530	7644	7755	7864	7970	8075	9
52	7298	7416	7532	7645	7757	7866	7972	8076	8
53	7300	7418	7534	7647	7759	7867	7974	8078	7
54	7301	7420	7536	7649	7760	7869	7976	8080	6
55	7303	7422	7537	7651	7762	7871	7977	8082	5
56	7305	7424	7539	7653	7764	7873	7979	8083	4
57	7307	7426	7541	7655	7766	7875	7981	8085	3
58	7309	7428	7543	7657	7768	7876	7983	8087	2
59	7311	7429	7545	7659	7770	7878	7985	8088	1
60	7313	7431	7547	7660	7771	7880	7986	8090	0
	43	42	41	40	39	38	37	36	M

A Table of Sines.

The Degrees of the Quadrant.

M	54	55	56	57	58	59	60	
1	8092	8193	8292	8388	8482	8573	8663	59
2	8094	8195	8294	8390	8483	8575	8663	58
3	8095	8197	8295	8391	8485	8576	8665	57
4	8097	8198	8297	8393	8487	8578	8666	56
5	8099	8200	8298	8395	8489	8579	8668	55
6	8100	8201	8300	8396	8490	8581	8669	54
7	8102	8203	8302	8398	8491	8582	8670	53
8	8104	8205	8304	8399	8493	8584	8672	52
9	8105	8206	8305	8401	8494	8585	8673	51
10	8107	8208	8307	8402	8496	8587	8675	50
11	8109	8210	8309	8404	8497	8588	8676	49
12	8111	8212	8310	8406	8499	8590	8678	48
13	8112	8213	8311	8407	8500	8591	8679	47
14	8114	8215	8313	8409	8502	8593	8681	46
15	8116	8216	8315	8410	8503	8594	8682	45
16	8117	8218	8316	8412	8504	8596	8684	44
17	8119	8220	8318	8414	8506	8597	8685	43
18	8121	8221	8319	8415	8507	8599	8687	42
19	8122	8223	8321	8417	8509	8600	8688	41
20	8124	8225	8323	8418	8511	8602	8690	40
21	8126	8226	8324	8420	8513	8603	8691	39
22	8128	8228	8326	8421	8514	8605	8692	38
23	8129	8230	8328	8423	8516	8606	8694	37
24	8131	8231	8329	8424	8517	8607	8695	36
25	8133	8233	8331	8426	8519	8608	8697	35
26	8134	8235	8332	8428	8520	8610	8698	34
27	8136	8236	8334	8429	8522	8612	8699	33
28	8138	8238	8336	8431	8523	8613	8701	32
29	8139	8240	8337	8432	8525	8615	8702	31
30	8141	8241	8339	8434	8526	8616	8704	30
	35	34	33	32	31	30	29	M

A Table of Sines.

The Degrees of the Quadrant.

M	54	55	56	57	58	59	60	
31	8143	8243	8340	8435	8528	8618	8705	29
32	8144	8245	8342	8437	8529	8619	8706	28
33	8146	8246	8344	8438	8531	8621	8708	27
34	8148	8248	8346	8440	8532	8622	8709	26
35	8149	8249	8347	8442	8533	8623	8711	25
36	8151	8251	8348	8443	8536	8625	8712	24
37	8153	8253	8350	8445	8537	8627	8713	23
38	8155	8254	8352	8446	8539	8629	8715	22
39	8156	8256	8353	8448	8540	8630	8716	21
40	8158	8257	8355	8449	8541	8631	8718	20
41	8160	8259	8356	8451	8543	8633	8719	19
42	8161	8261	8358	8452	8545	8634	8720	18
43	8163	8263	8360	8454	8546	8636	8722	17
44	8165	8264	8361	8455	8548	8637	8724	16
45	8166	8266	8362	8457	8559	8638	8725	15
46	8168	8267	8364	8458	8551	8640	8726	14
47	8170	8269	8366	8460	8552	8641	8728	13
48	8171	8271	8367	8462	8554	8643	8729	12
49	8172	8272	8369	8463	8555	8644	8731	11
50	8174	8274	8371	8465	8557	8646	8732	10
51	8176	8276	8372	8466	8558	8647	8733	9
52	8178	8277	8374	8468	8560	8648	8735	8
53	8180	8279	8375	8470	8561	8650	8736	7
54	8181	8281	8377	8471	8563	8651	8738	6
55	8183	8282	8379	8473	8565	8653	8739	5
56	8185	8284	8380	8474	8566	8655	8740	4
57	8186	8285	8382	8476	8567	8656	8742	3
58	8188	8287	8383	8477	8568	8657	8743	2
59	8190	8289	8385	8479	8570	8659	8745	1
60	8191	8290	8387	8480	8572	8660	8746	0
	35	34	33	32	31	30	29	M

A Table of Sines.

The Degrees of the Quadrant.

M	61	62	63	64	65	66	67	
2	8749	8832	8913	8990	9065	9138	9207	58
4	8752	8835	8915	8993	9068	9140	9209	56
6	8755	8838	8918	8995	9070	9142	9212	54
8	8758	8841	8921	8998	9073	9145	9214	52
10	8760	8843	8923	9000	9075	9147	9216	50
12	8763	8846	8926	9003	9078	9149	9218	48
14	8766	8849	8928	9006	9080	9152	9221	46
16	8769	8852	8931	9008	9083	9154	9223	44
18	8771	8854	8934	9011	9085	9156	9225	42
20	8774	8857	8936	6013	9087	9159	9228	40
22	8777	8860	8939	9016	9090	9161	9230	38
24	8780	8862	8941	9018	9092	9164	9232	36
26	8783	8865	8944	9021	9095	9166	9234	34
28	8785	8867	8947	9023	9098	9168	9236	32
30	8788	8870	8949	9026	9100	9171	9239	30
32	8791	8873	8952	9028	9102	9173	9241	28
34	8794	8875	8954	9031	9104	9175	9243	26
36	8796	8878	8957	9033	9107	9177	9245	24
38	8799	8880	8960	9036	9109	9180	9247	22
40	8802	8883	8962	9038	9112	9182	9250	20
42	8805	8886	8964	9041	9114	9184	9252	18
44	8808	8889	8967	9043	9116	9187	9254	16
46	8810	8891	8970	9046	9119	9189	9256	14
48	8813	8894	8972	9048	9121	9191	9259	12
50	8816	8897	8975	9051	9123	9194	9261	10
52	8819	8899	8978	9054	9126	9196	9263	8
54	8821	8902	8980	9056	9128	9198	9265	6
56	8824	8905	8983	9058	9131	9200	9267	4
58	8827	8907	8985	9061	9133	9203	9270	2
60	8830	8910	8988	9063	9135	9205	9272	0
	28	27	26	25	24	23	22	M

A Table of Sines.

The Degrees of the Quadrant.

M	68	69	70	71	72	73	74	
2	9272	9338	9398	9457	9512	9565	9614	58
4	9276	9340	9401	9459	9514	9566	9616	56
6	9278	9342	9403	9461	9516	9568	9617	54
8	9280	9344	9405	9463	9518	9570	9619	52
10	9283	9346	9407	9465	9519	9571	9620	50
12	9285	9348	9409	9466	9521	9573	9622	48
14	9287	9351	9411	9468	9523	9575	9624	46
16	9289	9352	9413	9470	9525	9577	9625	44
18	9291	9354	9415	9472	9527	9578	9627	42
20	9293	9356	9417	9474	9528	9580	9628	40
22	9296	9358	9419	9476	9530	9581	9630	38
24	9298	9360	9420	9478	9532	9583	9632	36
26	9300	9363	9422	9480	9534	9585	9633	34
28	9302	9365	9424	9481	9535	9586	9635	32
30	9304	9367	9426	9483	9537	9588	9636	30
32	9306	9369	9428	9485	9539	9590	9638	28
34	9308	9371	9430	9487	9540	9591	9639	26
36	9310	9373	9432	9489	9542	9593	9641	24
38	9313	9375	9434	9491	9544	9595	9642	22
40	9315	9377	9436	9492	9546	9596	9644	20
42	9317	9380	9438	9494	9548	9598	9645	18
44	9319	9381	9440	9496	9549	9600	9647	16
46	9321	9383	9442	9498	9551	9601	9648	14
48	9323	9385	9444	9500	9553	9603	9650	12
50	9325	9387	9446	9501	9554	9604	9651	10
52	9327	9389	9447	9503	9556	9606	9653	8
54	9329	9391	9449	9505	9558	9608	9655	6
56	9332	9393	9451	9507	9559	9609	9656	4
58	9335	9395	9453	9509	9561	9611	9658	2
60	9336	9397	9455	9510	9563	9613	9659	0
	21	20	19	18	17	16	15	M

A Table of Sines.

The Degrees of the Quadrant.

M	75	76	77	78	79	80	81	82	
5	9663	9706	9747	9784	9819	9850	9879	9905	55
10	9667	9710	9750	9787	9822	9853	9881	9907	50
15	9670	9713	9753	9790	9824	9855	9884	9909	45
20	9674	9717	9756	9793	9827	9858	9886	9911	40
25	9678	9720	9760	9796	9830	9860	9888	9912	35
30	9681	9724	9763	9799	9832	9863	9890	9914	30
35	9685	9727	9766	9802	9835	9865	9892	9916	25
40	9689	9730	9769	9805	9838	9868	9895	9918	20
45	9692	9734	9772	9808	9840	9870	9896	9920	15
50	9696	9737	9775	9811	9843	9872	9898	9922	10
55	9699	9740	9777	9813	9846	9874	9900	9924	5
60	9703	9745	9781	9816	9848	9877	9903	9925	0
	14	13	12	11	10	9	8	7	M

The Degrees of the Quadrant.

M	83	84	85	86	87	88	89	
5	9927	9947	9963	9977	9987	9994	9998	55
10	9929	9948	9964	9978	9988	9995	9998	50
15	9931	9950	9965	9978	9988	9995	9999	45
20	9932	9951	9967	9979	9989	9996	9999	40
25	9934	9952	9968	9980	9990	9996	9999	35
30	9936	9954	9969	9981	9990	9996	9999	30
35	9937	9955	9970	9980	9991	9997	9999	25
40	9939	9957	9971	9982	9992	9997	9999	20
45	9940	9958	9972	9984	9992	9998	9999	15
50	9942	9959	9973	9984	9993	9998	10000	10
55	9944	9960	9975	9985	9993	9998	10000	5
60	9945	9962	9976	9985	9994	9998	10000	0
	6	5	4	3	2	1	0	M

The

The Extraction of Roots.

IT is not unneceſſary, before we do enter into this order and method of teaching how to extract a *Root*, to ſhew their divers kinds and definitions: Therefore you muſt know that of *Roots* there are ſundry ſorts, according to the quantities from which they are derived, as the *Square Cubes*, *Squared Squares*, *Surdſolids*, *&c.* for the numbers receive their names of the ſaid quantities, every quantity having his *Root*, which may be called the Firſt quantity, becauſe it is the ſide or beginning of the quautity whereunto it is ſet: Numbers of the Second quantity are called *Squares*, of the Third *Cubes*, of the Fourth *Squared Squares*, as before; wherein you may proceed infinitely if you will: but you ſhall ſeldom or never have uſe for the extraction of the *Root* of any quantity more than *Squares* and *Cubes*; a *Square* number is the Product of any number multiplied in it ſelf, and the *Root* thereof is the Multiplier, whereby the ſame ſquare number is produced: As for Example, 4 is a Square number coming of the multiplication of 2 in it ſelf, which is the *Root* thereof.

A *Cubick* number is the product of a number multiplied into it ſelf, and the ſame Product multiplied again by the firſt number; As 2 multiplied by it ſelf is 4, that Product multiplied again by 2, the firſt number, makes 8, which is a *Cubick* number, and the *Root* thereof.

A *Squared Square* number is produced of 3 Multiplications; firſt, any number by it ſelf makes a *Square* number, that Product again by the firſt Root or multiplier, makes a *Cubick* number; and laſtly, that Product again by the firſt Figure or Root, produceth a *Squared Square* number, as 2 multiplied in it ſelf makes 4 a *Square* number, that again by 2, makes 8, which is a *Cubick* number, and then that Product again by 2, produceth 16, which is a *Squared Square* number, and the Root thereof is 2; a *Surdſolid* number is the Product of a number multiplied 4 times by the *root* thereof, as 32 is a *Surdſolid* number, the Root whereof is 2: for 2 multiplied in it ſelf is 4, that multiplied again by 2 is 8, the ſame Product again by 2, makes 16; and laſtly, the ſame Product multiplied by the firſt number 2, makes 32. Therefore I conclude that 32 is a *Surdſolid* number, and

the number 2, whereby the ſaid number is produced, is the *Surdſolid root* to the ſaid number, and thus multiplying the laſt Product by the firſt number or *Root* you may proceed infinitely, but more than theſe are needleſs, and as I ſaid before, without any great or common uſe.

Now for the finding the Root, it muſt be done according to the quantity whereof it taketh denomination, or whether it be of a Square or *Cube*, or otherwiſe: which known, let us proceed to the working thereof.

You muſt underſtand that the order for extracting the *root* of any quantity, is not much unlike to Diviſion; differing only in this, that whereas in Diviſion the Diviſor is known, but here it is to find: alſo in Diviſion you always keep one Diviſor, but in this you muſt change your Diviſor at each removing, which is at the finding of every figure contained in the *root*. Now therefore I will lay down one general way for the extraction of the *root* of all quantities whatſoever, which is done by certain numbers applied to each ſeveral quantity, which are theſe: for the *Square root* is one number required, which is 20. for the *Cube* two numbers, which 300 and 30. For the *Squared Square* three numbers, *viz.* 4000, 400, and 40.

Thus having declared the kinds, numbers, quantities, and order of the extraction of all ſorts of *roots*, it followeth we proceed to the practice thereof: And firſt, to extract the *Square root* of any number, you muſt conſider as before I have ſaid, that 20 is the number for the ſame quantity: Alſo you muſt learn by memory the juſt *ſquare* of all the 9 Units, which if you know not, this Table will ſtand you in ſome ſtead: where you ſee that againſt every of the 9 Units aforeſaid, towards the right hand of the *Square* of that unity againſt which it doth ſtand: which known, ſet down the number whereof you would extract the *Square root*, then under the laſt figure at the right hand put a prick, and then proceeding towards the left hand under every ſecond figure put a prick, that done, draw with your Pen a *Quotient*, as in Diviſion: Now for to find the *root* of your given number, ſeek the greateſt *ſquare* number contained in the number over the firſt prick, that *ſquare* number take from the number over the ſaid firſt prick, and ſet the remainer over it, the root of which *ſquare* number put in the *Quotient* for the figure of the *root*, that

1	1
2	4
3	9
4	16
5	25
6	36
7	49
8	64
9	81

root

root multiply by 20, the number for the *Square root*, and then look how often the Product thereof may be taken from the number over, or to the left hand of the ſecond prick, which put in your Quotient for your ſecond figure of the root: but this is to be noted for a general Rule, That you muſt take no greater number for your ſecond figure than that the *Square* thereof added with the former Product, may be taken from the number over the ſaid ſecond prick, and alſo look how many pricks are under your given number, ſo many figures muſt be in the Quotient for the Root of the ſaid number: then having two figures in the Quotient, if there be any more pricks, multiply the whole number in the Quotient by 23, and ſeek how often the Product thereof may be taken from the number over or belonging to the next prick, which number put in the Quotient, and adding the *Square* thereof to the former Product, ſubſtract the whole ſum from the number over the ſaid prick, and cancelling the ſaid number, as at each remove you muſt do, ſet the remainer over it, and if there be any more pricks undone, do as you did before, always multiplying the Quotient by 20, thereto adding the Square of the laſt figure, and the total ſum being ſubtracted from the laſt remainer, if there reſts nothing, it is a Square number, or elſe not; which you may prove, if you multiply the Root by it ſelf ſquarely, for the Root being truly extracted will produce the firſt given number. But becauſe that Examples are the eaſieſt for the underſtanding, let 104976 be a given number, whereof I would know the ſquare root, (*viz.*) that number being multiplied in it ſelf will produce the aforeſaid number of 104976. Therefore, firſt I ſet down the ſaid number, and under the laſt figure towards the right hand which in this example is 6, I put a prick or point, another under the 9, and laſtly, another under 0, leaving one figure betwixt every prick: which done, and the Quotient drawn, the number given will ſtand thus: whereby I ſee that the Root of the ſaid number muſt conſiſt of 3 figures, becauſe it hath 3 pricks under it: then I ſee the greateſt Square number is 10, it being the number belonging to the firſt prick towards the left hand, that I find to be 9, which is produced of 3 multiplied Squarely, therefore I put 3 in the Quotient of the firſt figure of the Root, and the Square thereof being 9, I ſubſtract from 10, the number over the firſt prick,

104976(

and

and there reſts 1. The order of which work will ſtand thus: where you ſee that the figures over the firſt prick are cancelled, there is 3 in the Quotient for the firſt figure of the *Root*, and reſts, which with the figures betwixt it and the next prick, make 149 for the number of the ſecond prick.

Now for the ſecond figure of the *Root*, I multiply the *Root* already found by 20, and the Product is 60, that I ſeek how often I may take from 149, the number over the 2 prick, which I may do 2 times, for 2 times 60 is 120, whereunto the *Square* of 2, which is 4 being added, makes 124; that ſubſtracted from 142 leaves 25, therefore I put 2 in the Quotient for the ſecond figure of the *root*, and cancelling the figures over the ſecond prick, the remainer being put over it, the working hereof will ſtand in this order, where you ſee the Quotient is 32 for the two firſt figures of the *root*, and the figures of the 2 firſt pricks being cancelled, there reſts 25, which with the other figures betwixt them, and the third and laſt prick, makes 2576 for the number over the laſt prick.

Now therefore to find the laſt figure of the *root*, I multiply the *root* already found, that is to ſay, 32 by 20, and the Product thereof is 640, that I ſeek how often it may be taken out of 2576, the number over the laſt prick, which may be done 4 times, for 4 times 640 is 2560, whereunto if I add the Square of 2, there will amount 2576; which becauſe it may be taken for the number remaining over the laſt prick, I put 4 in the Quotient for the laſt figure of the *Root*, and ſubſtracting the former Product of 2576, from the number over the laſt prick, which is likewiſe 2576, there will reſt nothing, therefore I cancel thoſe figures likewiſe, and thereby conclude 100976 to be a *ſquare* number, and 324 to be the *Root* thereof.

1
x 4976(3
9

x25
x 4976(32
9
124
20
3
60
2
120
4
124

x28
x 4976(324
9
124

2576
32
20
640
4
2560
16
2576
324
324

The

The proof whereof is by multiplying the *Root* into it ſelf Squarely: for if you multiply 324 by 324, the Product will be 104976, which was the firſt given number, and ſhews the number to be a *Square* number.

	1296
	648
	972
	104970

I doubt not, but to any indifferent conceit, this Example will ſuffice, as well as if I ſhould contrive a whole Volumn thereof, when it is ſo, that a given number is a right *Square number*. But if the number given be not a *Square number*, it is impoſſible to find an exact *Root* thereto, but that after the work there will remain ſomething as a fraction or part of a number more to be added to the Quotient; for the true and perfect valuation of which fraction or remainer, none yet could attain, but they have ſet down ſo near a way for the extraction of the root of any number, not being a ſquare number, that thereby no great error may be perceived. For the knowledg and better underſtanding of which, let this be a familiar Example. You know that 16 is a right ſquare number, and the *Square root* ſhould have 4 in your Quotient likewiſe for the *Square root* thereof, but then there will reſt 2, whereby you ſee that 18 is no Square number, neither can you know what fraction to make of it, by reaſon that you have no certain Diviſor, that might ſtand for the Denominator to the Numerator or Remainer: Only let this ſuffice, that to find the neareſt Root thereof, the Rule is thus; double the Remainer of the Numerator, and Quadruple, *viz.*

Multiply the *Root* by 4, and thereto add 1 for the Denominator to the ſaid Numerator, as in this Example, to extract the neareſt *Square root* of 18

$18(4\frac{2}{17}$
16

I find 4 to be in the Quotient, and 2 remaining, which 2 being doubled, makes 4 for the Numerator, and 4 the *Root* being multiplied by 4, makes 16, and 1 added therewith makes 17 for the Denominator, whereby I ſay that $4\frac{2}{17}$ is the neareſt *Square root* of 18, which may be found out: For if you reduce $4\frac{2}{17}$ into one common Denomination, and then multiply them ſquarely, the Product will be $17\frac{1}{16}$ which is but $\frac{1}{16}$ too little.

Thus having declared the order how to extract the *Square root* of any number, it reſteth now that I ſhew the manner of Extracting the

the *Cube* Root of any number: As for the principal uſes thereof you ſhall find in the general practice of the *Mathematicks*: but ſome few uſes of them I have inſerted after the extraction of the *Cube root*.

To find out the *Cube root* of any given number, being a right *Cube* number: firſt put down the given number, and as in the *ſquare* number you put points or pricks, beginning at the right hand, and ſo towards the left, leaving betwixt each point one figure void; ſo in the extraction of the Root of a *Cube* number, you muſt leave two figures void or unprickt betwixt every point: and as in the Square root, ſo likewiſe in this, look how many points are in the given number, ſo many figures muſt be contained in the Root thereof, which is alſo to be obſerved in extracting the Root of any quantity whatſoever.

1...	1
2...	8
3...	27
4...	64
5...	125
6...	216
7...	343
8...	712
9...	729

Theſe things being conſidered, it is alſo neceſſary, that you know the greateſt *Cubick* number, of every of the Nine Unites, whereof the Table in the Margin maketh explanation: where you ſee that againſt each unity ſtandeth the *Cube* number thereof: which being known, and the given number prickt, with a Quotient drawn as before I have ſhewed. To extract the *Cube root* you have two numbers, *viz.* 300 and 30. But becauſe the working thereof would be too long to expreſs in terms,

Let 12487168 be a given number, whereof I would extract the *Cube root*. Firſt having pricked it, and drawn a Quotient for the Root, as in the Margin, I ſee the Root muſt conſiſt of three figures, ſo many pricks being under the number given. For the finding of which figures, I ſeek firſt the greateſt *Cube* number in 12, the number over the firſt prick, which is 8, the Root whereof being 2, I put in the Quotient, and ſetting 8, the *Cube* thereof under 12, and ſubſtracting it from them, there remains 4.

4
xz487168(2,
8

For the ſecond Figure.

4 300 3
2 .30 9
27

Then for the ſecond Figure of the Root, I put down 300 and 30, the numbers of the *Cube Root*, and againſt 30 I ſet 2, the firſt Figure of the Root found, and againſt 300 I ſet 4, which is the *ſquare* thereof; and multiply 300 by 4, the Product is 1200; Then I conſider how often I may take this

this number 1200: from the number over the ſecond Prick, which is 4487, and I find it may be taken three times, therefore I put 3 in the Quotient for the ſecond Figure of the Root, and likewiſe after the number 300, and the *Square* thereof, which is 9, I put after 30, and the *Cube* thereof, which is 27, I put under 30: Then I multiply all the numbers in the firſt row each by other, *viz.* 4 by 300, makes 1200, and that by 3, makes 3600, which I ſet by it ſelf. Then I multiply 2 by 30, which makes 60, and that by 9, which makes 540, which I put under the other Product. Laſtly, Becauſe 27 hath no number with it, I ſet it down under the two former Products, and adding them together, the Sum thereof is 4167, which I ſet in order under the Figures of the ſecond Prick, and ſubſtracting it from them, there remains 320 to be joyned to the number over the third Prick, which makes it 320168.

30	300
2	4
60	1200
9	3
540	3600
3600	
540	
27	
4167	

4320
xx4487168 (23
8

4167

For the third Figure of the Root, I put down the two numbers 300 and 30 as before, and againſt 30, at the left hand, I put down 23 the *root* already found, and againſt 300 the *ſquare* thereof, which is 529, then multiply 529 by 300, the Product is 158700, I find this may be taken twice out of the remaining number of the *Cube* 320168, therefore I put 2 in the Quotient for the third figure of the *root*, and likewiſe ſet 2 at the right hand of 300, and the *ſquare* thereof which is 4, at the right hand of 30, and the *cube* thereof, which is 8, I put under 30. Then I multiply all the numbers in each row into one Product, *viz.* 529 by 30, makes 15870, and that again by 2 makes 31700, which I ſet by it ſelf; then I multiply 23 by 30, which makes 690, and that again by 4, makes 2760, which I ſet under the former Product. Laſtly, Becauſe

529. 300. 2
23. . 30. 4
. 8.

529	
300	
158700	
	2
317400	

23	
30	317400
690	2760
4	8
2760	320168

```
 4320
12487168(232
 320168
```

Proof.

```
      232
      232
    -----
      464
     695
    464
    -----
   52825
     223
   -----
  107648
 161472
107648
-------
12487168
```

8 hath no number with it, I set it down under the other two Products, and casting up the sum of all three, they make 320168, which taken from the number over the last Prick, there rests nothing. So I conclude that 232 is the *Cube Root* of the foresaid number 12487168.

For the Proof thereof, multiply the said number 232 Cubically, as you see in the Margin, *viz.* 232 by 232, makes 53824, and that again by 232, makes just 12487168, the number first proposed.

But when you have a number given to extract the *Cube Root*, and the foresaid given number, is not a right *Cube* number; whereby you cannot come to any perfect *Root* thereof, but that there will remain some Fraction or broken number after your said Extraction; the manner to Extract the *Root* of a number not Cubical, as most Writers do affirm, is thus;

The difference between the *Cubick* number of the *Root*, and the *Cubick* number of a number more than the *Root* by an Unity, shall be the Denominator to the Remainer, also added thereto.

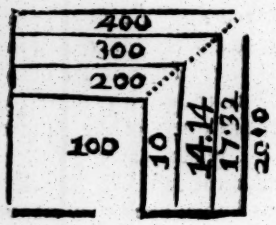
As for Example.

Let 12 be the number given, which not being a right *Cube* number, I would find the greatest *root* thereof; First, the greatest *Cubick* number in 12 is 8, the *Cube root* whereof being 2, I put in the Quotient, and Substracting 8 the *Cube* thereof from 12, there will rest 4, which 4 being over, sheweth that 12 is no *Cubick* number; therefore adding 1 to 4, makes 5, which I put for the Numerator: and to find the Denominator thereto, I set down the *Cube* of 2 the *root* found, which is 8, and likewise 27 the *Cube* of 3, which is a number more than the *root* by 1; then substracting the one from the other, *viz.* 8 from 7, leaves 19 for the Denominator. By which reason the nearest *Cubick root* of 12 is $2\frac{5}{19}$, which being reduced and multiplied Cubically, makes $11\frac{4058}{6059}$, the same abreviated, makes 11, and very near $\frac{5}{80}$ and it should be 12, therefore the error is $\frac{1}{8}$ too little; which although in this is no great error, yet in a great summe the

the error would be very much; Therefore for those which desire a more exact and perfect extraction of the *Square* or *Cube Root*, from numbers not being right *Square* or *Cubick* numbers, Mr. *Record* in his *Whetstone of Wit*, setteth down an exact way (but very tedious) which is thus: For the *Square Root*, add to the given number so many times two Cyphers, as you desire the nearness of the Root: And for the *Cubick Root* so many times 3 Cyphers, as you desire the exactness of the Root thereof: and under the said Cyphers put Pricks in such order as before is taught, and then mark how many Pricks there is over and beside the Pricks of the given number, and then extract the Root from all those Cyphers, in such order as you did before: For if there be 1 more, the Roots shall be Tenths, and the Remainer parts of $\frac{1}{100}$; if there be 2 Points or Pricks over more than the given number, then the Root shall be Hundreds, and the remainer parts of $\frac{1}{100}$: if 3 Pricks be over, the *root* shall be Thousands, and the remainer parts of $\frac{1}{1000}$, and so you may come to a very near *root*, but not to any exact or perfect *root*, unless the given number be a right Square or Cubical number. Thus the Square *root* of 18 may be found to be 4, $\frac{2}{10}\frac{4}{00}\frac{2}{00}\frac{6}{00}\frac{4}{00}\frac{2}{00}\frac{6}{00}\frac{8}{00}\frac{7}{00}\frac{1}{00}\frac{2}{00}$; and the Cube *root* of 12 will be found 2 $\frac{2}{10}\frac{8}{00}\frac{2}{00}\frac{4}{00}\frac{1}{00}\frac{0}{00}\frac{0}{00}$. This way is very exact, though somewhat troublesome; but if you have a Table of *Logarithms*, which are now very common, (though not known in the time of this Author) the work is most easie. For half the number of any *Logarithm*, is the Logarithm of the Square Root; and the third part of the number of any Logarithm, is the Logarithm of the Cube Root. So that you need only divide any Logarithm by 2, and you have the Logarithm of the Square Root, or by 3, and so you shall have the Logarithm of the Cube Root; which will shew you the Cube and Square Roots in decimal parts very exactly.

Of the Use of the Square, and Square Root.

First, To make a Square, Two, Three, or Four, or any number of time bigger than another Square. Square the side thereof, and so find the Content, which being doubled, trebled, or quadrupled, and the Root thereof extracted, shews the side of the Square desired.



Thus the ſide of a Square being 10, the Content is 100, the double thereof being 200, the Side or Root thereof will be found to be 14, 14 parts. The treble thereof being 300, the Side or Root thereof is 17, 32 parts. The quadruple thereof being 400, the Root thereof is 20. Which though it be but double to the firſt Side or Root 10, yet is four times the quantity.

Secondly, As you do by the Square, ſo you may do for the Circle, knowing either the Diameter, Semidiameter, or the Circumference thereof; Square it, that is, multiply it in it ſelf, and then double, or treble, or quadruple the number, and extract the Square Root thereof, ſo you ſhall have the Diameter or Circumference of a Circle that ſhall be 2, 3, or 4 times bigger than the other. Thus the Diameter of a Circle being 7 inches, the Square thereof is 49, the double thereof is 98, the Root thereof is 9, 90 parts *ferè*, the treble thereof, or 49 by 3 is 147, and the Root of that 12, 11 parts. The Quadruple thereof is 196, and the Root thereof 14, which is double to the firſt Diameter, and 4 times in value. And ſo if the Compaſs of a Cable be 7 Inches, one of 14 Inches compaſs ſhall fathom for fathom weigh 4 times the weight. And ſo likewiſe if it be but 3 Inches and an half in Compaſs, which is but the half of 7 Inches, it ſhall be but a quarter of the weight and ſtrength. And ſo you may find the weight and ſtrength of any Cable or Hawſer, by ſquaring the Compaſs thereof, and comparing it with another, whoſe weight and compaſs is known.

Thirdly, If you add two Squares of any two numbers together, they will amount to the Square of the Sloap Line, which ſhall make them ſtand at right angles. Thus in any plain right angled Triangle, having the Perpendicular, and the Baſe, you may find the ſloap Line.

For

For Example: Take these three small numbers, 3,4,& 5, (which are eminently known to make a right angled Triangle, being found out long since by *Pythagoras*) having the two sides 3, and 4, you may find the sloap side to be 5. For the Square of 3 is 9, and the Square of 4 is 16; these 2 Square numbers added together, make 25, the Square Root whereof is 5, which is the length of the sloap side. And so it will be in any other Triangle proportionably to the sides thereof. And thus by the Longitude and Latitude of two places, you may find their distance, as is shewed before, *Page* 109, or 110.

9
16
25
5

Fourthly, Having the sloap Line of such a Triangle, and one of the other sides, to find the Base, work thus; Square the sloap Line, and likewise Square the other side, and substract the Square of the side, from the square of the sloap Line, and there will remain the Square of the other side. Thus for Example, the sloap Line being 5, the Square thereof is 25; and one of the sides being 3, the Square thereof is 9; which substracted from 25, there remains 16, which is the Square of 4, which is the other side. And so likewise if you substract 16, which is the Square of the other side, from 25 the Square of the sloap side, there will remain 9, which is the Square of 3, for the other side. This you may make good use of in Navigation, and Surveying, to find out Perpendicular and sides of Triangles.

25
9
16
4
25
16
9
3

Lastly, As you may thus find the sides of this right angled Triangle, and so with a little more trouble you may find out the sides of any Triangle; for the whole Canon of Sines, Tangents, and Secants are made after this manner. But this may suffice for a taste of the use of the square Numbers, and their Roots.

The

The Uſe of the Cubick Numbers, and their Roots.

THe uſe hereof is much like to the uſe of the Squares, only what they perform in the Superficies of any Figure, theſe perform in the ſolid Body thereof.

Firſt therefore, If you would double the Cube, or make one cubical or ſolid Body, equal to any two leſſer ones, take the ſide of each Cube, and multiply it cubically in it ſelf; then add them both together, and extract the Cubick Root from them, and that ſhall be the ſide of the Cube equal to them both. Thus if you have a Cube that is 4 inches or feet on each ſide, and would have a Cube made as big again, multiply the ſide four in it ſelf, it makes 16, and that multiplied again by 4, makes 64: the double whereof is 128, and the Cubick Root thereof is near 5 ſomewhat above it, for the Cube of 5 is 125, and more exactly the Cube Root of 128 is 5,01465 parts, and ſuch a Cube ſhall be double to a Cube of four inches. But if you double the ſide of the Cube, and ſo make it 8 every way, ſuch a Cube ſhall be 8 times bigger than the number of 4; for 8 times 8 is 64, and 8 times 64 is 512, which is the content of the Cube of 8.

Secondly, As it falls out thus in Square Cubical bodies, ſo it is likewiſe in round Bullets, or ſolid Globes; ſo that knowing the weight of any Bullet whoſe Diameter is known, you may know the weight of another Bullet by its Diameter. Thus a Bullet of Iron of 4 Inches Diameter weighs 9 pounds; and a Bullet of 5 Inches or a little more, ſhall weigh 18 pounds, which is double the weight; and a Bullet of 8 Inches Diameter ſhall weigh 72 pound, that is, 8 times the weight. And ſo by cubing the Diameter of any Bullet, you may find the weight thereof. As the Cube of 4, which is 64, to 9 pound weight; ſo the Cube of 5, which is 125, to 17 pound, 58 parts. And ſo by the weight you may find the Diameter.

To conclude, As it is in round and ſquare ſolid Bodies, ſo it is in all other ſolid Bodies, ſo that knowing the Mold and Burden of one Ship, you may build another thereby on the ſame Mold of what Burden you pleaſe; either more or leſs, after this manner; Meaſure the length of the Keel, the length of the Mid-ſhip Beam, the depth in the Hold, and ſuch like parts as make the Shape and Mold

of

of the Ship, and multiply them cubically, part by part, and so make each part proportionable. *For Example*, Supposing a Ship of 100 Tuns being thus measured, was found to be 44 foot long by the Keel, 20 foot broad upon the Mid-ship Beam, 9 foot deep in the Hold, and did rack it with the Stem forwards 13 feet, and the Stern-post did rack 7 foot offwards, and you would desire to make another Ship of the same Mold, whose Burden should be double to it, that is, 200 Tuns. Multiply each of these numbers cubically, as first, the length of the Keel being 44 foot, multiplied cubically, *viz.* 44 by 44, makes 1936, and that again by 44, makes 85184, which number must be doubled, because the Ship is to be double the Burden of the other, so it makes 170368, then you must extract the Cube Root of this number, and it will yield 55 feet, 437 thousand parts *ferè* of a foot, which is 5 inches, and almost a quarter of an inch. And so you must do by all the other dimensions of the Ship, to find the length of every of them, and so make them all proportionable to each other.

Or else you may in such a case as this, when you have many lengths to find, having found out one of them as before by the Cube, you may find the other by the Rule of Proportion. Thus having found the length of the Keel to be 55 feet 437 parts; and if you would find the length of the Mid-ship Beam proportionable to this which in the Ship of 100 Tuns was 20 foot, Say,

		feet. parts.	foot. feet. par.
For the Mid-Ship Beam 20 Foot.	As	44, to 55. 437 :	so 20, to 25. 199
For the depth in the Hold, 9 Foot,	As	44, to 55. 437 :	so 9, to 11. 339
For the racking of the Stem, 13 Foot.	As	44, to 55. 437 :	so 13, to 16. 579
For the Stern-post which did rack 7 Foot offward.	As	44, to 55. 437 :	so 7, to 8. 819

Or else having found the proportion of one Cube to another, you may work by that, Thus,

The Cube of 1 being	1.000	The Cube of 5 or *quin.*	1.710
The Cube of 2 or the *double*	1.260	The Cube of 6. or *sext.*	1.817
The Cube of 3 or *triple*	1.442	The Cube of 7 or *septu.*	1.913
The Cube of 4 or *quadruple*	1.557	The Cube of 8 or *octup.*	2.000

And thus the foresaid supposition, being 44 by the Keel, for a Ship of 100 Tuns, to find the length of the Keel for a Ship of 200, 300, *&c.*

Tuns.

	Tuns.		Feet.		Feet. parts.	
For a Ship of	200.	As 1. 000,	to 44 :	ſo 1. 260,	to 55. 440	The length of the Keel.
	300.	As 1. 000,	to 44 :	ſo 1. 442,	to 63. 448	
	400.	As 1. 000,	to 44 :	ſo 1. 587,	to 69. 828	
	500.	As 1. 000,	to 44 :	ſo 1. 710,	to 78. 240	
	600.	As 1. 000,	to 44 :	ſo 1. 817,	to 79. 948	
	700.	As 1. 000,	to 44 :	ſo 1. 913,	to 84. 172	
	800.	As 1. 000,	to 44 :	ſo 2. 000,	to 88. 000	

And out of theſe few Proportions, you may draw many more; but this is enough at preſent, to ſhew the uſe of the Square and Cube *Roots*.

A Declaration of the Tables of Longitude and Latitude of places following.

THe Tables hereafter following, ſhewing the *Longitude* and *Latitude* of places, *viz.* of Kingdoms, Provinces, Cities, Iſles, Capes, Bayes, Rivers, Mountains, eſpecially the moſt principal of them in the whole World, are gathered from the lateſt Deſcriptions, Maps, and Charts, as well univerſal as particular: who albeit they differ greatly in *Longit.* yet in *Latit.* moſt of them agree, and alſo having a reſpect to the beginning of each of their ſeveral *Longit.* they come all to a near agreement. For ſome beginning their *Longit.* at the weſtermoſt part of *Africa*, makes the *Longit.* of *London* to be about 10 *d.* 20 *m.* Others beginning at the *Canary* Iſlands, makes the *Longitude* of *London* 18 *deg.* Others more weſtward make it 19 *deg.* 30 *min.* And *Jodocus Hondius* beginning the *Merid.* at the Iſle *Pace*, one of the *Azores*, makes *London* to be in *Longit.* 27 *d.* 40 *m.* But I following Mr. *Emery Mollineux*, according to his great Globes, do account the *Long.* from the weſtermoſt parts of St. *Michaels*, another Iſle of the *Azores*, the midſt of which Iſle is 50 *min.* in *Longit.* and from the weſtermoſt part thereof, the *Long.* of *London* is 25 *d.* 40 *m.* which in effect is not much different from any of the others. Note, that the *Long.* is counted from the *Merid.* paſſing over the aforeſaid place Eaſtwards, into a continual Progreſſion to the end of 360, which is the whole circumference of the world. *Latitude* is counted from the *Equinoctial* to the end of 90 *d.* on each ſide thereof. And where the letter *S* is after any number, it ſhews the place to have ſo many *d.* and *m.* of South *Lat.* all the reſt having no Letter adjoyning, have North *Latit.* the whole being ſet in Alphabetical order, for the readier finding of any place therein contained. And where the *Long.* and *Lat.* of any Kingdom is ſet down, and with the ſyllable *Reg.* it expreſſeth the middle thereof.

A

A Table of the *Longitude* and *Latitude* of all the notable places in the World, newly Corrected and enlarged by Mr. *T. Stern*, Globe-maker.

A	Longit.	Latitude
Acapulco	265 00	19 00
Acartii an Iſl.	329 01	52 01
Azores an Iſle	357 01	39 01
Achaguas	101 30	05 30 S
Achin	132 30	34 40
Aden	81 12	50 01 S
Adia	50 11	25 01 S
Adu	105 41	05 41
Ægypt	64 03	30 01
Africa Reg.	40 01	30 01
Agonata	162 21	38 11
Agragam	144 29	08 21 S
Aguada ſegura	253 29	24 01
Aqua la de pozos	245 20	28 00
Alina a Mountain	98 41	54 20
Alacranes	283 05	22 01
Alagoa	58 41	29 41 S
Albion nova	235 01	50 00
Albiron	109 29	25 29
Alboram	25 29	35 29
Albrongh	26 25	52 20
Alepo	72 29	38 01
Alcada	23 04	40 29
Alexandria	65 01	31 21
Alexandria	73 11	36 21
Algazin	16 00	29 01
Algiero	33 01	35 21
Algueſeet	63 41	26 51
Alicante	28 41	39 01
Alicoa	76 30	13 21 S
Alicur	44 21	38 29
Alima	108 51	31 01

A	Longit.	Latitude
Alleluja	70 41	10 01
Almedina	34 01	33 41
Alpes a Mountain	41 29	47 29
Alſigubas	147 11	38 41
Amazen	45 29	12 41
Amazons Reg.	323 01	13 01
Las Amazona	312 29	1229 S
Ammon	59 41	27 11
Amſterdam	33 01	51 29
Averie a Mountain	116 00	54 09
Ancona	63 10	01 11
Ancona	43 29	43 51
Ambiona	161 54	03 20
Abona	164 30	06 10 S
Amiona	75 20	12 40 S
Andernopoly	58 11	44 41
St. Andre	170 29	12 01
St. Andre	22 11	56 21
St. Andreas	62 11	61 11
Las a Negadas	296 00	50 01 S
Angier	24 41	47 35
Angleſey	19 51	54 00
Anglia Reg.	23 00	53 00
Angoleſme	27 01	46 00
Antiochia	320 25	06 40
Antipara	74 02	25 20 S
Antwerpen	31 20	50 30
Arabia Felix	83 00	21 00
Arabia Deſert	77 00	30 00
Argier	32 50	35 40
Armenia Reg.	76 00	41 00
Arnaitus a Mount	35 00	12 30 S
Aſcenſion	35 20	18 50

A B	Longit.	Latitude
La Aſcention	15 30	08 00 S
Aſſyria Reg.	85 00	36 00
Athens	56 10	40 00
Avero	17 30	42 10
Auguſtine	293 00	29 50
Ausburgh	38 40	18 30
Azur a Mountain	59 00	22 40
Amiens	29 30	49 40
B		
BAntam	148 00	05 40 S
Babylon	82 20	33 50
Babelmandel	80 00	12 50
Bachu	88 50	42 00
Bactriana Reg.	115 00	38 30
Bagaſus a Lake	77 10	50 40
Baharam an Iſle	87 20	27 30 S
Bay Anegada	319 50	40 20 S
Bay de baxos anega-	321 30	39 50 S
Bianza (dos	149 25	03 00 S
Batavia	123 00	08 20 S
Bay a Dalagoa	56 10	32 10
Bay de Fumos	240 20	36 00
Bay de St. Migel	39 30	08 40
Bay de Ocfionora	312 30	41 00
Bay de Pinos	233 00	40 30
Bay Langos	18 00	37 30
Bacalaia	335 04	48 28
Bayona	17 20	42 10
Bayone	25 30	44 00
Balſera	82 04	31 10
Bamberg	39 15	50 10
Bandu	173 30	33 00
Bax de los pergos	345 30	20 00
Barbados	328 20	12 40
La Barbada	192 50	01 50
Barlingas	16 20	39 30 S
Barnagoſſos Reg.	70 00	13 00

B	Longit.	Latitude
St. Bartholome	194 30	14 00
Bermondas	316 10	32 30
Baſel	37 10	47 50
Beciaſa	65 00	10 30
Bell	76 15	27 10
Belef	69 00	51 40
Beliſſe	21 30	47 00
Belt	51 40	50 00
Bengala Reg.	126 00	26 30
Benichao	136 00	03 50
Benin Reg.	41 00	07 40
Bepitus a Mount	143 00	34 00
Bepitus a River	138 20	34 00
Berga	40 10	62 50
Borgen	30 39	60 50
Barwick	22 50	55 50
Bethle	138 50	25 40
Baiſer Reg.	50 00	04 00
Braligrod	58 20	47 30
Bilbao	29 30	43 00
Blaskey	12 00	51 40
Blaves	31 10	42 00
Blavet	21 15	47 50
Bloe	5 30	67 00
Blorneo	145 30	05 10
Borntholm	40 50	55 30
Bovenbergen	34 20	56 30
Brandenberg	42 30	52 50
Braſil	5 10	51 20
Braſilia Reg.	345 00	10 00
Brava	74 30	00 30
Breſt	20 00	48 30 S
Brunge	25 30	43 50
Bruges	29 00	45 30
Buda	48 00	47 20
Burdeaux	26 00	45 10
Briſtow	22 50	51 35
Brachipult point in Wales.	21 25	53 00

B C	Longit.	Latitude
Bachapto	31 00	59 50
Bruſſels	30 50	51 00
Barcelona	28 15	41 10
Burlings	16 00	39 38
C		
Capes		
CAp. St. Francis	335 00	48 05
Cap Raſo	334 40	46 28
Cap Maſſiſaco	24 00	43 32
Cap de las penes	21 00	43 35
Cap de alinde	46 50	01 00 S
Cape de Ambe	83 30	12 00 S
Cap de St. Anton	289 15	22 50
Cape clear	14 10	51 09
Cap de S. Antoni	74 30	17 00 S
Cap de S. Auguſt	162 00	06 30
Cap de S. Auguſt	354 00	08 30 S
Cap baxo	328 00	04 20
Cap de las baxes	19 41	15 29
Cap Bedford	320 01	65 29
Cap blanco	273 19	25 21 S
Cap blanco	281 19	10 29
Cap blanco	331 21	04 26
Cap blanco	334 21	52 01
Cap blanco	259 41	02 21 S
Cap blanco	151 01	22 41
Cap brava	275 01	27 29
Cap de breton	331 01	45 41
Cap cameron	287 21	25 41
Cap comerin	115 15	07 30
Cap cantin	17 01	32 11
Cap de S. Kather.	41 01	01 01 S
Cap cod	317 00	41 00
Cap de cro	31 29	42 11
Cap de croce	65 21	48 21
Cap Deſierto	318 12	29 21
Cap Deſparance	324 29	51 01

C	Longit.	Latitude
Cap S. Domingo	318 21	46 41 S
Cap falſo	49 31	34 40 S
Cap fear	305 11	32 29
Cap felix	84 29	14 11
Cap finis terræ	16 01	43 11
Cap Florida	293 21	25 29
Cap formoſo	28 01	05 01
Cap froward	302 39	53 21
Cap de gato	16 39	36 51 S
Cap de S. Helena	326 11	36 11 S
Cap de ſantiago	309 01	37 29
Cap S. John	62 29	67 29
Cap de Krin	13 01	53 41
Cap de S. Maria	77 29	24 01 S
Cap de S. Maria	82 52	15 51 S
Cap de Maio	327 11	35 11 S
Cap de S. Maria	9 41	21 41
Cap de la Moſa	36 51	06 29
Cap de Nombre de Jeſus	308 11	53 01 S
Cap Ortegal	18 29	44 11
Cap de Palmas	348 11	01 19
Cap de S. Paul	32 00	05 59
Cap de Peſcadores	277 40	28 00
Cap del Plate	352 50	05 00 S
Cap Primero	48 30	02 20 S
Cap de 3 Points	28 30	05 00
Cap de Puntas	315 30	10 40
Cap Daduillias	42 01	34 30
Cap de Rozo	334 30	46 30
Cap ſalida	74 00	26 10 S
Cap deſpigiel	353 20	07 20 S
Cap de ſtavola	12 20	54 00
Cap Torrigo	11 30	18 20
Cap la vela	305 10	11 10
Cap S. Vincent	302 20	52 40 S
Cap de Virgin *M.*	308 00	52 10 S
Cap de Vittoria	297 30	12 00 S
Cap Paſſaro	46 29	36 51

C	Longit.	Latitude
Cap Rasalgare	96 21	22 21
Cap raso	317 40	08 00
Cap roxent	16 29	38 50
Cape roxo	11 01	12 00
Cap of good Hope	50 30	35 40 S
Cap del spirit. sanct.	161 11	13 11
Cap S. *Vincent*	17 00	37 00
Cap Verd	9 51	14 20
Cap de bona vesta	334 21	49 11
Cap Walsingham	321 01	63 41
Campon Reg.	136 01	47 00
Cairo	67 29	30 00
Calamita	67 41	48 10
Caldy	20 01	51 49
Calecut	112 41	10 29
Calice in *France*	29 10	50 40
Calibia Reg.	42 10	35 20
California	245 00	30 00
Camanor	300 20	16 30 S
Cambaba	150 00	08 10 S
Cambaya	110 00	22 00
Camboya Reg.	142 20	11 40
Capiapa	304 50	34 00 S
Casma a River	121 40	61 00
Castrum Portugal	57 10	20 20 S
Cazan	86 20	56 30
Chaga	56 00	06 20 S
Chialo	56 20	07 00 S
Chi imazata	294 30	06 30 S
Chio	58 30	40 30
Chiguisamba	305 30	17 00 S
Coale	55 00	21 30
Coile	48 20	03 10 S
Cora	85 10	19 20
Coronades	296 30	45 00 S
Corpo santo	84 10	07 30 S
Cummana	313 20	07 00
Cusgo Reg.	297 30	13 30 S
Cales in *Spain*	20 50	36 19

C	Longit.	Latitude
Cambalu	161 11	51 40
Canada	305 11	50 21
Canaria Grand	9 29	27 21 S
Candia	59 29	35 21
Caribes	316 11	07 00
Cartagena	200 00	20 11
Cartagena	28 21	38 20
Cartago	299 29	03 11
Caesna Reg.	38 21	17 11
Casser Reg.	32 01	47 01
Cataio Reg.	150 00	53 01
Carnes Reg.	22 09	58 29
Carwick	41 11	69 11
Chester in *England*	21 29	53 51
Chichester	24 11	51 06
Chidlies cape	326 41	67 29 S
Chily Reg.	305 00	30 01
Chirman Reg.	96 00	26 29
Cyrena	53 29	32 00
Cypres	68 04	37 30
Clearmount	30 55	45 51
Cocas a Mountain	79 00	47 29
Chohiu	114 00	09 14 S
Callai Reg.	310 00	16 00
Colmogory	62 41	63 41
Colne	34 00	51 41
Commania Reg.	86 00	51 00
Congu	147 21	49 11
Coninxberg	49 11	55 29
Constantinople	61 01	44 40
Copenhage	38 29	55 51
Cotasua Reg.	108 01	37 00
Cork in *Ireland*	15 44	51 41
Corfu an Island	22 00	39 19
Corinth	54 21	39 00
Corsica	38 11	42 00
Coatam Reg.	230 00	51 00
Cracow	48 29	50 00
Cuba	196 00	31 41

C D E	Longit.	Latitude
Earl of *Cumberlands* Isles	316 00	63 21
Curſitan Reg.	87 00	32 00
Connaught	15 35	53 45
Cambridge	25 50	52 14
D		
DAngali Reg.	78 00	11 00
Diu	107 03	20 42
Damon	108 08	19 20
Dabol	109 06	17 45
Dawina	74 30	62 10
Dagar Oort	48 41	39 41
Dolacia	77 00	14 21
Damaſcus	74 29	35 00
Danzick	46 00	55 00
L. Darcies Iſle	327 51	68 21
Derwinda	47 51	57 26
Deventer	33 26	51 51
Diep	28 41	49 29
Dires cape	321 29	64 51
Dominica	319 41	14 00
Don a River	75 00	53 21
Donecz a River	71 00	51 00
Dorow	58 00	51 29
Dover	28 11	51 00
Dublin	16 41	53 11
Dumaran	150 00	08 41
Duy	34 29	59 21
Duyhe	56 29	50 29
Davis Straights	324 01	64 00
Darby	24 05	52 55
Dunkirk	29 10	51 12
E		
EBaida	60 01	25 29
Edinbrough	22 01	55 51

E F	Longit.	Latitude
Ely	25 40	52 40
Elior	26 20	10 10
Queen Elizabeths Foreland	337 01	61 30
Embden	34 10	53 10
Ens	43 00	48 30
Ens	74 10	37 30
Epheſus	60 30	39 40
Ergas	86 00	38 00
Euboya	59 13	41 00
Euphrates a River	76 40	40 00
Europa Reg.	55 00	51 00
Exceter	22 10	51 05
Enchiſen	31 40	52 54
F		
FAlſterhood	40 00	56 00
Famagoſta	69 20	37 30
Farollones	294 20	11 40 S
Fargana	114 40	46 00
Farre	16 20	61 30
Cape fatache	86 50	15 40
Faſo	75 50	45 40
Farnaſa	38 10	30 10 S
Fernandobuck	351 40	09 20
Fees Reg.	21 50	32 50
Fierro	6 20	26 30
Finmark	47 00	69 30
Flambrough head	25 20	54 00
Flensburgh	36 40	55 00
Flecorie	32 00	58 00
Flye	32 00	53 33
Florence	41 10	43 40
Flores Iſland	353 40	39 20
Florida Reg.	292 00	31 00
Flocen	38 49	66 30
La Formanos	310 30	40 40
Formentera	31 10	38 50

F G	Longit.	Latitude
Forteventura	11 00	28 00
Foyl	15 50	55 30
Frails	314 30	11 20
Frankfort	36 30	50 00
Freezland	351 30	62 00
Forbishers straight	331 20	64 00
A furious Oversal	322 30	60 00
Farre Islands	17 00	62 10
Farnil Isle	24 45	60 00
Ferando	164 00	32 35
G		
GAgo	25 00	08 35
Galathia	37 20	37 00
Gambria a River	12 00	13 10
Gant	30 20	20 40
Garamantica	51 30	16 00
Garnsey	22 20	49 40
Gaza	70 50	33 10
Gamba	94 40	17 30 S
Gargiza	62 40	12 00 S
Gemenacota	18 40	06 00
Geneva	10 40	46 20
Genua	37 50	45 00
Genua	15 20	16 00
Gerguth Reg.	153 00	57 00
Germanarco	40 00	51 00
Gerselvin	24 30	32 20
Gomera	07 30	27 00
Ghir a River	25 30	22 00
Giamber	18 01	33 41
Gilberts sound	326 51	67 01
Giras a River	41 21	20 11
Gallaway	15 40	53 15
Goa	102 21	15 14
Glasgow	29 00	57 00
Golfo de Bengala	125 00	15 00
Golfo de S. Helen	48 42	33 29 S

G H	Longit.	Latitude
Golfo de la India	44 21	03 14 S
Golfo de los negro	350 30	02 00 S
Golfo de Rey	40 41	05 30
Golfo de rodos santos	345 30	01 41 S
Golfo de S. Anton	46 20	26 00
Golfo frio	45 30	20 00
Gothland	45 21	57 30
Gozo	58 20	34 41
Granada	318 20	11 00
Granata	23 30	38 00
Grecia Reg.	54 00	40 00
Gratiosa	357 30	39 02
Gronninghen	32 11	53 00
Groenland	345 00	75 00
Groy	21 00	47 21
Guinea nova	180 00	05 00
Guinea Reg.	18 00	09 00
Gunagona	67 30	06 00
Gibraltar straight	21 30	36 00
Greenlane	50 00	77 00
H		
HAles Island	327 30	63 00
Haliber	78 41	20 01
Haliez	52 51	48 41
Hambrough	37 11	53 21
Hartlepool	24 00	55 21
Harwich	27 29	52 00
Havana	292 11	23 00
Hebrides	15 20	58 00
Hydelberg	36 00	49 00
Helst	23 29	46 29
Heishant	19 29	48 41
Heptapolis	324 29	25 21
Hercules Pillars	69 21	32 11
Hellichland	33 51	66 00
Hercania Reg.	100 00	40 00

H I	Longit.	Latitude
Hiſpania Reg.	25 00	40 01
Nova Hiſpania	280 00	13 29
Hiſpaniola	306 00	18 29
Holindal	36 11	61 01
Honts Oort	48 30	59 01
Horne	12 10	66 10
Hull	25 21	53 41
Hungaria	50 00	48 01
Hidaſpes a River	124 00	33 21
Hipaſis a River	124 00	33 01
Helin head	15 00	55 15
Hereford	22 38	52 12
Heel of Dantzick	46 11	55 40
I		
Jambick	121 30	01 15 S
Jacatra	140 00	06 00 S
Jamaica	298 30	17 00
Jaſques in Perſia	94 00	25 40
Japan	169 00	38 00
Jarſey Iſland	23 00	49 20
Java Major	140 00	09 00 S
Java Minor	151 00	08 00 S
Jazin	77 30	20 30
Japata	141 20	07 40
Jericho	73 01	33 00
Jeruſalem	72 21	33 00
Ilemens a River	105 00	27 00
Imaus a Mountain	128 00	39 00
India Oriental	135 00	26 00
Indus a River	115 29	26 00
Inſpurgh Iſlands	40 41	47 50
The three Iſlands	169 21	40 00 S
Iſle de Avis	310 30	11 09
Iſle de Avis	173 50	04 30
Iſle de Baſtinado	293 30	10 30
Iſle Brava	1 20	14 20

I	Longit.	Latitude
Iſle de corales	194 40	09 50
Iſles Deſierto	178 00	31 01
Iſle del fuego	2 30	14 21
Iſle de los fuegos	181 29	27 40
Iſle de los Galopegos Majores	281 10	04 00
Iſle de los Galopegos Minores	277 30	01 10
Iſle de Hombres blancos	169 20	05 41 S
Iſle de S. Jago	158 20	08 00 S
Iſle S. Ivan	164 30	06 00
Iſle de los Ladrones	177 31	15 11 S
Iſle de los Labos	317 41	40 21
Iſle de S. Maria	296 29	37 02
Iſle de Martin Vaz	11 21	21 01 S
Iſle de Mayo	4 29	13 29
Iſle de S. Michael	000	38 25
Iſle de Negros	155 29	10 29
Iſland of Fowls	334 00	50 00
Iſle de Orleance	312 00	50 00
Iſle de pajoros	314 06	12 41
Iſle de palmas	163 21	08 00 S
Iſle de paxaros	198 51	08 51
Iſle de paxaros	234 21	28 00
Iſle de Pearls	293 10	07 00
Iſles de Pinos	292 21	21 29
Iſle de Rees	162 00	25 20
Iſle of Salt	500	18 26
Salomon Iſland	204 40	10 00 S
Iſle Solis	347 00	10 29
Iſle S. Thomas	38 00	00 00
Iſle S. Thomæ	252 00	20 11
Iſle de Verde	353 51	45 29
Iſle S. Vincent	175 56	08 00
Iſle S. Vincent	73 21	20 29 S
Iſle de S. Catalina	234 10	27 30 S
Iſle de S. cedros	240 39	29 50 S

I K L	Longit.	Latitude
Isle de fornan laro	354 20	02 29 S
Isle de lima	395 10	22 00 S
Isle Secas	46 20	29 30 S
Isle de Tristan de Acunia	26 30	39 00 S
Joam	135 00	07 29
Jolofo	24 29	06 00
Ipswich	27 12	52 22
Joppe	71 21	34 00
Isabella	305 21	18 51
Island	08 00	66 00
Italy Reg.	42 29	43 00
Ireland	16 00	52 29
Jucatan Reg.	283 00	18 00
Jugor	138 00	06 50
Juica	31 21	39 30
Julibella	61 00	01 30
K		
Kalmucha in Tartaria	95 00	51 00
Carakit hath Reg.	119 00	51 00
Kasakky Tartaria	103 00	51 00
Kithais Reg.	110 00	57 00
Kithay a lake	123 31	53 00
Kolay	54 51	69 00
Kolenig	04 11	65 10
Kosar a River	96 40	49 00
Kintale	19 30	56 45
Kinsale	15 03	52 35
L		
Lacerna	24 50	39 30
Ladena	53 30	41 31
Ladoga	62 10	61 40
Lago de los coronadus	295 01	44 00 S
Lampess	36 21	23 00

L	Longit.	Latitude
Lancerota	11 41	29 30
Lanow	51 11	52 20
Laredo	12 51	43 00
Larisa	70 00	33 00
Larta	53 00	46 00
Lake de Gouleme	306 40	48 00
Lacus arnubus	131 00	60 10
Lacus falsus	137 40	47 30
Leon	23 11	42 15
Leon	283 41	11 21
Leopolis	52 51	49 02
Lepin	98 00	58 41
Leguio major	165 00	28 00
Leguio minor	158 41	22 00
Lerida	28 21	41 30
Lester point	335 00	62 00
Lima	296 41	23 30 S
Limonia	72 11	44 20
Lymosa	43 29	34 50
Lions	32 41	45 40
Liorn or Ligorn	40 21	43 30
Lisbon	17 29	39 11
Lyzard	18 30	50 10
London	25 50	51 40
London coast	316 11	72 00
Lepeso	74 01	49 41
Loyre a River	24 14	47 41
Longsound	34 30	58 55
Lubeck	38 02	53 51
Lucka	42 11	52 00
Lucky	64 00	58 21
L. Lumleys Inlet	320 00	61 00
Luna a Mountain	60 00	16 00
Lundy	19 02	51 00
Lurske	54 00	50 21
Luzon an Island	156 00	17 00
Libia	33 90	23 30
Lin	29 25	52 48
Lincoln	25 25	53 22

M	Longit	Latitude
MAboda	62 41	13 30
Machina	106 41	00 29
Machoenta	93 51	33 41
Mecfin Iſland	93 30	75 30
Macyra an Iſland	93 00	19 40
Madera Iſlands	8 11	31 29
Meotis palus	71 30	39 20
Magadoxa	78 00	05 11
Magalo	71 20	09 12 S
Mardo	2 40	46 40
Magellon ſtraights	305 00	53 25 S
Majorca Iſland	1 31	30 00
Malibrigo	178 51	26 01
Malaca	137 00	03 30
Malaga	23 05	37 21
Maldivat an Iſland	113 00	03 00
Malorca	31 31	30 00
Malta an Iſland	46 00	35 31
Man an Iſland	19 00	54 51
Moſambique	10 00	14 32
Magador	16 20	31 50
Mamora	155 00	00 30
Mombaſa	71 00	04 50 S
Mangeſia	61 19	41 29
Mangichina	150 00	37 00
Manica	62 51	23 39 S
Maniconga Reg.	46 00	05 00
Maniola Reg.	140 30	03 50 S
Merchant Iſle	330 00	68 21
Mare de Bachuor the Caſpian Sea	92 00	45 00
Mare congelatum	345 00	64 00
Mare de India	120 00	10 00 S
Mare major	68 00	46 00
Mare meditham	59 00	35 00
Mare rubrum	75 00	20 00
Mare vermero	55 00	26 00
Mare deltzur	370 00	15 00

M	Longit.	Latitude
Margarita	314 11	10 50
Marigalante	320 00	15 00
Marmos	306 21	40 40
Morocco	20 00	30 19
Marcellis	33 51	43 40
Mafalig	23 29	30 20
Milford haven	20 25	51 48
Maſtagan	30 01	35 20
Mazaker	167 00	33 00
Madagaſcer	77 00	19 05 S
Marecapane	312 10	08 00
Meander a mount	152 00	31 30
Maleſtream	36 00	57 22
Meb	46 29	54 30
Medina cely	32 29	41 10
Medina talnaby	37 00	27 20
Manilia	156 00	03 16
Medino	98 29	36 29
Middlebrough	29 40	52 00
Meſſien	41 00	51 10 S
Melinde Reg.	71 21	03 20
Melley Reg.	15 41	12 00
Melving	48 01	54 50
Ments	35 51	10 00
Meſhet	85 29	52 50
Meſopotamia	78 01	35 00
Meſſana	45 51	34 50
Metz	33 29	49 45
Mien Reg.	136 01	31 00
Mienskow	56 41	54 50
Millain	38 29	06 10
Minorca Iſle	34 26	40 00
Moldavia Reg.	55 00	46 00
Molines	30 21	46 00
Molucca Iſlands	160 41	01 00
Memorancie	130 00	47 00
Mongul	160 00	61 30
Monte de Branid	47 11	30 15 S
Mount Frogoſo	344 00	2 00 S

MN	Longit.	Latitude
Mont Negro	44 41	17 00 S
Mont Raleigh	321 30	65 00
Montroal	301 00	45 40
Morea Reg.	54 30	38 00
Mosaick	68 50	55 00
Mosanbique Reg.	70 20	14 40
Moscovia Reg.	80 00	59 00
Moscow	70 00	55 40
Mossa	84 30	35 00
Mossul	84 00	34 55
Mozena	24 20	34 30
Moa	96 36	21 31
Minas	165 00	36 20
Meseneck	69 50	51 30
Munster	35 00	52 10
N		
NAbarz	79 50	50 50
Naman Reg.	140 00	64 00
Naynen	31 10	50 00
Nantes	24 10	47 50
Napoly	45 00	41 00
Napoly	55 10	08 00
Napthaly	73 00	34 30
Narbona	30 20	43 20
Nadenburg	47 10	67 05
Narve	56 10	60 00
Narvare	26 40	41 39
Naseph	110 30	43 00
Natoria Reg.	66 00	41 00
Nazareth	72 40	34 10
Newcastle	23 10	55 20
New-found-Land	334 20	48 30
Nicoria	9 30	39 30
Nicober an Island	130 30	06 40
Nicodemia	63 30	44 20
Nicopolis	56 30	45 00
New England	315 00	43 00
New Plimouth	315 00	41 37
New Salem	315 10	42 35

NO	Longit.	Latitude
Nesiot	57 40	59 50
Nilus a River	67 20	32 00
Ninus	82 20	37 00
Nisa	36 10	44 00
Nissa	45 30	50 30
Naze in *Norway*	31 00	58 05
Noes a Mountain	81 00	40 21
Nolon	30 00	40 22
Nombre de dios	294 29	09 22
Norumbega	315 41	43 41
Norway	35 00	62 02
Novograde	57 11	53 02
Nowgred	65 29	52 41
Nowgorod	62 51	60 29
Nowgorod	80 02	55 21
Nubia Reg.	57 02	13 00
Nubia a River	57 02	15 41
Noremberg	39 09	49 29
Norwich	27 15	52 45
O		
OBy a River	107 01	55 00
Ocea a River	77 29	55 41
Olant	43 29	57 00
Oleron	24 29	45 29
Olone	24 29	47 00
Omagua Reg.	310 00	09 00 S
Omba	54 11	66 51
Onega a River	56 41	64 00
Onegaburg	59 29	62 29
Opawkow	69 10	53 30
Orcades Isles	22 11	59 02
Orellana	310 00	05 00
Orina Reg.	119 01	19 02
Orleans	28 29	48 02
Ormus Isle	91 20	28 40
Orsa	59 51	54 21
Orsa	47 21	61 29
Ottona	44 29	42 40
Ortonto	40 24	40 21

O P	Longit.	Latitude
Oxenford	24 00	51 00
Oya Reg.	75 00	13 00
Oſtend	29 29	51 29
Orenge	30 35	43 35
Orleance	27 52	47 42
Old-ſound	31 36	51 25
Ordfornes	28 52	00 15
P		
PAgaoſa	99 51	45 00
Paito	290 30	05 10 S
Palagoſa	47 29	43 00
Palandura Iſland	108 00	1 00
Palaria	60 21	39 21
Palma Iſland	6 00	28 00
Palona	205 00	02 00 S
Palmer	120 00	41 00
Pambolona	24 29	42 41
Panama	194 29	08 11
Pantanalia	42 50	36 29
Panuco	270 11	22 20
Pavia	375 50	46 10
Patricks Purgatory	115 55	54 32
Paris	29 02	48 29
Parma	39 20	45 18
Paſſan	41 50	48 41
Paura	37 51	46 11
Paznaſi	155 29	45 51
Pechora	65 51	67 00
Pechora Caſtle	73 21	64 51
Pegu	135 50	20 00
Perim Reg.	132 00	51 29
Perigo	323 11	43 21
Perpow	53 29	58 41
Peru Reg.	296 00	10 00 S
Peruſia	42 20	43 11
Peſcara	34 39	30 11
Philipina Iſland	158 00	15 00
Palimbam	142 40	07 30
Pico	356 41	38 21

P	Longit.	Latitude
Piccora Reg.	317 00	10 02
Pigmea	148 41	32 02
Philimgu	144 21	40 02
Pina	296 21	03 01 S
Pinga	101 40	14 20
Port de los Leones	318 00	42 30
Pyramides	173 11	10 21
Piſa	40 29	43 41
Pizan	73 00	51 29
Plata	315 00	19 51
Plimouth	21 11	50 51
Pooske	48 11	52 41
Plotsko	57 29	57 41
Podolia Reg.	59 00	49 29
Poyectiers	26 29	47 21
Poldaved	20 05	47 55
Polonia Reg.	53 01	50 00
Buen porta	177 21	02 00 S
Port de Canonas	239 21	36 41
Port de Cavallos	283 00	14 21
Port de la concepti	45 41	04 21 S
Port deſire	313 00	47 41 S
Port Famine	302 51	53 11 S
Port Fremo	44 00	04 00 S
Port Delgado	42 21	03 51
Port de S. Miguel	240 29	35 02
Port de Nigrillo	296 51	17 11
Porta port	17 30	41 15
Port Sallido	186 41	03 00
Port Samo	10 00	32 29 S
Port S. Vincent	337 21	23 51
Prage	42 29	50 00 S
Preſlaw	49 40	51 11
Preſlaw	99 41	49 45
Portland	22 49	50 40
Point comfort	309 10	37 12
Primsberg	48 10	55 11
Pruſſia Reg.	50 00	54 06
Ptolomais	66 41	09 40

P Q R	Longit.	Latitude
Punto de St. Hellen	290 11	02 11 S
Punto de St Hellen	325 21	37 30
Punto de Sr. Lucas	152 29	13 29
Priamum	118 00	00 20
Q		
Quanzu	157 29	44 10
Quelenſu	158 29	56 01
Quiantu	144 41	42 20 S
Quiſa Reg.	69 51	08 51
Quinza	153 00	40 01
Quinto	293 11	00 01
Quivita	233 00	42 00
R		
Aguſi	40 29	44 00
Rameſes	68 29	30 30
Rane	352 41	63 00
Ravanna	42 21	44 21
Rhodes	61 41	37 11
Rianrech	93 41	40 00
Ribadeo	20 21	43 21
Richman Iſle	317 30	43 34
Riga	53 53	58 00
Rems River	30 35	49 12 S
Rio de Arboledas	329 00	01 41 S
Rio de St. Auguſt.	350 00	15 03 S
Rio de Sr. Barbara	326 41	34 01 S
Rio del Braſil (nes	348 21	17 11 S
Rio de los Camero-	42 00	05 25 S
Rio de Camerones	315 00	44 29
Rio del Campo	42 29	02 51
Rio de Angela	42 30	01 40
Rio de Canno	298 40	33 10
Rio dulce	316 29	52 00
Rio de St. Domingo	353 00	07 51 S
Rio del eſtremo	340 41	22 59 S
Rio de Flores	285 19	29 00
Rio del gado	34 21	06 21
Rio de Gigantes	278 20	09 00
Rio Grande	301 11	11 00

R S	Longit.	Latitude
Rio Grande	314 29	44 00
Rio del Guato	284 29	19 29
Rio de la Hatha	304 15	10 41
Rio de St. Helena	248 41	10 29 S
S. Laurence River	318 51	53 00
Rio de Manicong	48 21	10 00 S
Rio del Oro	10 21	22 29
Rio de Xalmas	272 11	14 21
Rio Panuco	271 51	22 29
Rio de Perla	292 29	29 00
Rio de la plata	326 29	36 00 S
Rio Primero	327 41	55 00
Rio ſancto	300 29	03 00 S
Rio de ſpirito ſanct.	281 29	31 00
The white River	308 11	51 21 S
Rypon	35 29	55 21
Roan	27 41	48 51
Rochel	25 29	46 41
Romſy	42 29	42 00
Rooſewick	40 21	54 00
Roſtow	72 11	57 00
Ruſſia	57 29	59 29
Rye	24 29	51 01
Rio de ſenega	14 25	15 06
S		
Abarſa	154 51	45 00
Sabeſtan Reg.	114 00	34 00
Sabron	84 51	45 11
Saff	16 10	32 10
Saendeber	174 41	35 51
Segarin	95 29	38 21
Sala	89 41	48 00
Salamanca	20 25	40 51
Salaſta	72 41	41 51
Salina	45 00	38 29
Salle	20 10	33 30
St. Sebaſtina	24 25	43 15
Sylsburgh	42 00	48 21
Salſtom	32 21	62 00

S.	Longit.	Latitude
Salvado	321 21	05 00
Samarin	52 21	33 40
Sandersons Tower	320 00	65 09
Hope Sandersson	326 21	72 41
Sandry	162 51	53 02
Sanson	20 41	43 21
S. Crux	334 21	43 29
S. Christophers	319 10	17 00
S. Davids	20 00	52 00
S. Domingo	307 11	17 51
S. George	357 11	39 00
St. Helena	24 30	16 00 S
Santiago	264 29	20 29 S
Santiago	298 11	32 11 S
S. Jago	175 29	02 00
S. John de Luz	25 11	43 21 S
S. Lazaro	71 00	11 21
S. Lucar	21 21	37 11
S. Lucia	01 01	17 00
S. Malo	24 21	48 21
S. Maria	82 29	17 00
S. Maria	240 41	34 21 S
S. Maria	00 29	56 00
S. Maries	85 01	44 29
S. Maries of Naza	66 30	16 29
S. Martha	301 21	10 41
S. Martin	321 11	51 00
S. Martins Island	292 40	46 51
S. Matthews	21 11	01 51 S
S. Michel	60 50	65 29 S
S. Michael	00 50	38 05
S. Miguel	327 21	47 21
S. Miguel	291 41	09 11 S
S. Miguel	268 00	24 00
S. Miguel	249 00	32 51
S. Nicholas	69 00	64 00
S. Nicholas	323 21	53 41
S. Nicholas	2 02	17 00
S. Petro	64 29	01 29

S.	Longit.	Latitude
S. Pole de Lion	20 41	48 48
S. Sampson	306 29	40 29
S Vincent	0 29	17 29
S. Vincent	318 41	11 51
Sapon Island	107 11	00 29
Sarachi	84 29	44 11
Saragosa	26 11	41 51
Sardinia	39 00	40 00
Saturorum Island	174 11	46 30
Savatopoly	75 29	47 21
Scarbrough	24 51	54 51
Schotland	25 00	60 00
Scotland Reg.	20 00	57 00
Segedin	49 00	47 11
Serines	19 29	48 21
Senega Reg.	13 00	24 00
Serneti Reg.	106 29	33 29
Sabolisher	93 41	56 20
Shabaskik	91 29	53 09
Shrewsbury	22 35	52 55
Sierialeone	15 30	07 40
Scalholt	8 30	65 20
Sibier Reg.	96 20	59 30
Sicilia	45 00	37 30
Sidon	71 10	36 30
Siam	140 00	13 49
Sinai Mountain	27 00	30 00
Sinus Mexico	280 00	26 00
Sinus Persia	85 00	29 00
Sion	59 10	12 40
Sipanta	45 30	41 50
Sivil	18 06	37 45
Slaha	55 50	58 41
Slavonia	47 00	45 00
Sleigo in Ireland	15 35	54 15
Slowoda	60 00	64 30
Slowoda	86 30	59 51
Smyrna	60 20	40 29
Shavel	02 31	64 21

S T	Longit.	Latitude
Sorlings	18 00	50 00
Spacado	46 50	47 21
Spier	35 30	49 21
Spina	60 50	43 29
Stad	30 40	61 41
Stapholt	2 20	65 41
Sterin	42 10	53 51
Stoby	52 30	44 00
Stockholm	42 00	58 11
Straights of Maru-Chin	72 30	73 11
Swedia Reg.	40 00	60 00
Sumatra an Iſland	134 00	00 00
Suhar	94 23	23 05
Surrat	109 50	20 07
Swally wad	103 31	21 20
Saldan a Bay	49 40	33 40
Silly	18 00	50 02
Stert	22 50	50 40
Sweinburn head	25 00	59 51
Syria	74 00	39 00
Syracuſa	45 41	37 00
Southampton	24 05	51 11
T		
TArancо	48 00	40 29 S
Tarapaca	306 21	30 41
Tarbacan	109 29	34 51
Targa Reg.	32 00	25 00
Taragona	29 29	40 41
Tarſo	71 21	40 00
Tartar	152 00	63 21
Tartaria Reg.	130 00	62 00
Taskan Reg.	129 00	49 00
Tatracan	55 00	44 51
Tecou	116 29	00 41 S
Teneriff	8 11	27 29
Tendua Reg.	170 00	59 00
Teneſab	46 41	61 11
Tarcera	538 23	39 00

T V	Longit.	Latitude
Terra alta	160 29	09 51 S
Terra alta	25 21	15 21
Ter de los ſumos	322 29	40 21 S
Tharſis	315 29	49 00
Theſſalonia	53 44	44 21
Texel in Holland	31 00	53 15
Tholouſe	28 40	43 50
Thunnis	67 40	32 00
Tygris a River	84 00	34 30
Tocrors	54 50	46 00
Togora	146 00	49 50
Toledo	22 50	39 40
Tollon	34 05	43 20
Toul	33 10	40 10
Toutes	27 30	47 50
Trent	40 10	46 10
Triageon Iſland	278 40	21 00
Tribanta	63 30	41 50
Trinidad	355 20	19 10 S
Trinidad	295 50	21 20
Trinidad	319 20	09 00
Trinity Harbour	308 30	36 00
Tripolis Antiqua	44 21	30 20
Tripolis in Barbary	45 21	30 30
Tripolis Soria	72 21	37 00
Troyja	59 00	42 30
Troy	31 00	48 10
Tuna	41 51	64 30
Turſon	131 30	36 30
Tyrus	71 35	35 30
Tzerca	79 50	49 20
Taleo	159 00	03 30
Ternato	160 50	00 55
Tidore	160 50	00 50
Timote	139 12	10 20 S
Tunnis	40 00	36 00
V		
VAlentia	29 20	39 41
Varcano	107 50	39 00

V W	Longit.	Latitude
Varon	83 30	70 30
Vaygats an Iſland	81 30	69 21
Venice	41 40	45 51
Verma Reg.	133 00	21 30
Varona	40 40	45 50
Viana	17 30	42 00
Viatea	87 50	59 30
Vienna	45 30	48 30
Villa longa	28 20	07 40
Ville conde	17 30	41 30
Virginia	302 01	36 00
Viſhgrod	61 30	51 30
Bona Vaſta	2 30	15 30
Buena Viſta	308 04	40 11
Buena Viſta	177 30	13 30
Ulm	37 50	48 50
Volga a River	75 40	58 00
Upſalia	42 50	60 00
Vigis a River	85 50	53 20
Viſting	79 30	61 30
W		
Waersbergham	39 01	57 20
Wardhouſe	50 30	70 26
Earl Warwicks Foreland	323 10	62 01
Waterford	17 15	52 16
Count Warwicks Sound	330 48	64 41
Wakefield	23 45	53 48
Waſilgo Road	81 50	56 41
Waxon	49 20	52 29
Waymouth	23 50	51 00
Welichy	96 30	56 00
Wilikipoyaſſa	101 20	63 29
Wolifz	63 40	57 51
Weroy	39 50	68 41
Weſtel	31 29	51 29

W X Y Z	Longit.	Latitude
Weſterhold	40 29	67 41
Whitbay	24 26	55 00
Whitſon head	316 05	41 45
Wiborough	56 29	62 35
White Iſle	25 11	50 29
Sir Hugh Willoughbies Iſland	60 00	72 00
Winterton	27 20	53 29
Wologda	74 30	09 39
Wologda	73 50	60 00
X		
Xaques	282 20	20 29
Y		
Yarmouth	27 30	53 00
York	23 30	54 29
Yuagua	305 30	21 00
Yuchope	2 56	56 20
Z		
Zacana a River	6 40	13 00 S
Zacatula	269 40	20 00
Zacatan an Iſland	88 00	12 51
Zama	49 30	34 00 S
Zama	74 41	11 41
Zante	52 00	38 00
Zellam	104 00	18 00
Zanhage Reg.	20 00	24 00
Zanziber	37 52	05 29 S
Zara	46 29	45 41
Zaradus a River	126 00	44 00
Zavan	41 29	51 00
Zediea	48 00	29 29
Zegzeg	36 41	14 00
Zovazembla	83 29	74 00
Zinguis	76 11	49 29
Ziodalanel	337 31	03 51 S
Zuenzinga Reg.	25 00	15 00

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The Mariners Compaſs Rectified, a Book furniſhed with Tables of hour and Azimuth, uſeful in Navigation, calculated from 0 *deg.* to 60 *deg.* of Latitude, with the uſe of all Inſtruments in Navigation, by *Andrew Wekeley*.

The Mariners Magazine in *folio*, containing the Deſcription of the Scale of Scales, with the art of Navigation, Surveying, Gauging, Gunnery, Aſtronomy, Dyalling, Fortification. By Cap. *Sam. Sturmy*.

Mathematical Manual in *octavo*, by Mr. *Phillips*. Of Navigation, Gunnery, Dyalling, Surveying, Gauging: with a Table of Logarithms to 10000.

The Geometrical Sea-man ſhewing the 3 kinds of Sailing by the true *Sea-Chart*, *common Chart*, & by a great Circle, with 2 Traverſe Tables added by *H. Phillips*.